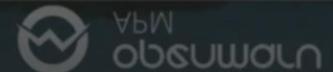


OPENMARU APM을 활용한 서비스 품질 진단 방법

Application Performance Management

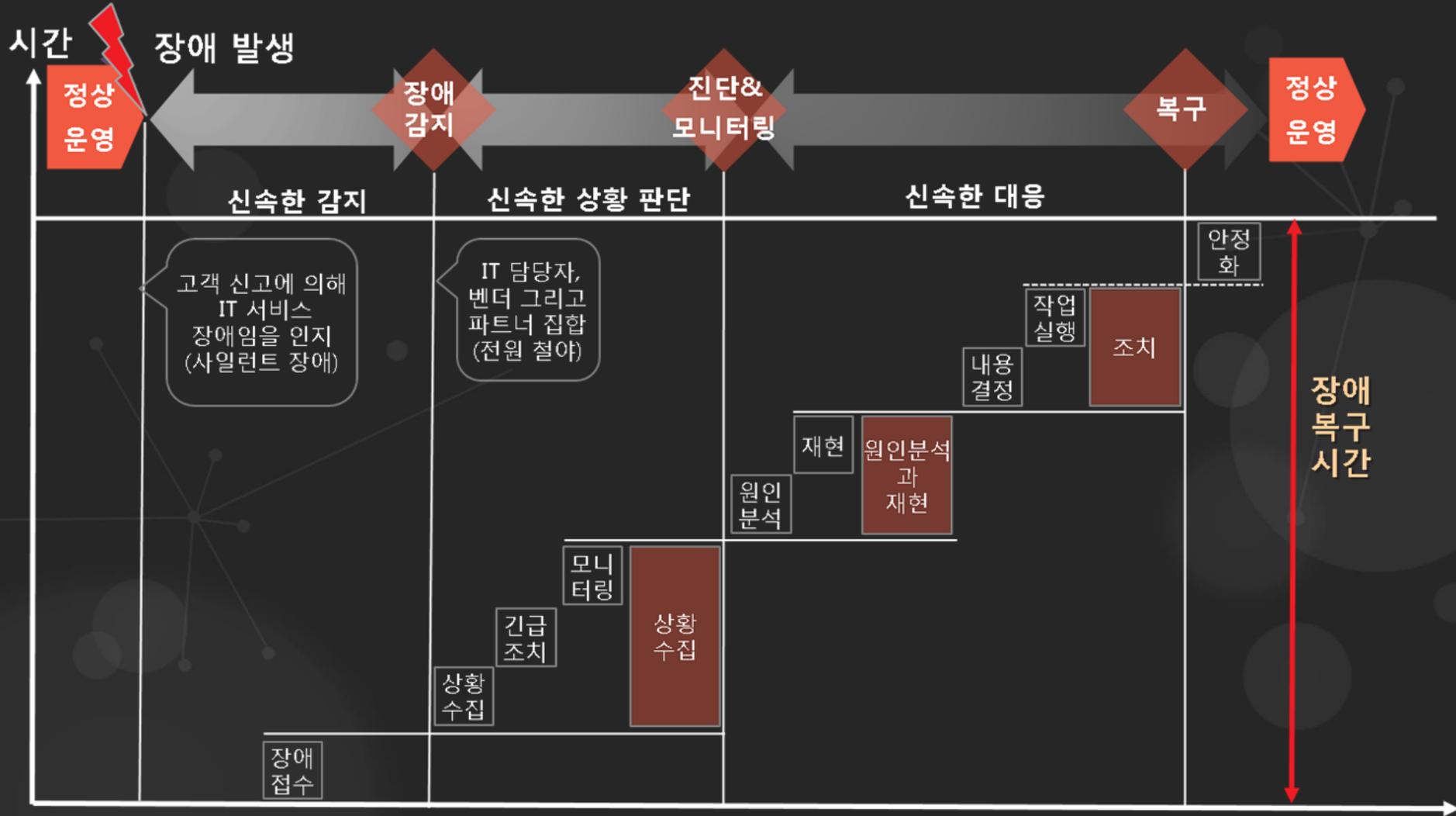
장애 시 APM의 활용 방법



시스템 장애시 장애보고서는?



Incident & Problem Management



장애 복구 과정 (Incident Lifecycle Management)

장애시 처리 및 확인 절차



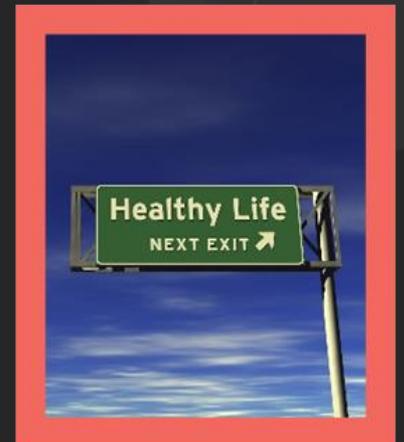
증상과 원인



진단 및 모니터링



조치



방지대책

장애 진단 보고서의 일반 유형

개요

- 시스템 : XO 시스템
- 발생 일시 : 2018년 11월 21일 10:20분
- 발생 인스턴스 : ranx11
- 현상 : 에이전트의 연결이 끊어졌다 재 접속되다

원인분석

- ranx11 인스턴스의 GC 사용률이 높음
- 에이전트가 응답이 없어 서버에서 연결을
- Full GC에 대부분의 시간을 사용하고 있었

원인

- 해당 인스턴스에 메모리 Leak 현상

현상 : 인스턴스가 응답하지 않아 연결이 종료됨

11/19 오전 8:26분경 DT-WAS03 서버에서 오픈 중인 was

① 인스턴스(ranx11)의 Heap Memory 사용률 임계값 초과 'CRITICAL' 경고 알림 치음 발생

11/20 오후 2:44분경 인스턴스(ranx11) 알림 발생

11/21 오전 10시 20분경 인스턴스(ranx11) ranx11 인스턴스의 응답이 없기 때문에 서버 강제 종료되었음

원인분석 : ranx11 인스턴스의 GC 현황

2018-11-21 09:30:00
 JVM MaxMemoryPoolCount: 153,887
 JVM MaxMemoryPoolCount: 308
 JVM MaxMemoryPoolCount: 16
 JVM MaxMemoryPoolCount: 8
 JVM MaxMemoryPoolCount: 8

11/21 오전 9시 30분 경부터 10시 30분까지 Full GC가 지속적으로 발생

Full GC: 메모리용 현상이 비유는 개념으로 다른 작업은 이 World 상태

원인분석 : 10시 20분경 Pending Transaction이 쌓임

Transaction Heatmap (T-Map)

Full GC가 발생했기 때문에 Transaction이 Pending되는 현상도 함께 발생

조치사항

- Heapdump 파일 생성 여부 확인
 - 파일 경로 : /app/dtwas/domains/RANG11/log/gclog/jav
- Heapdump 분석
 - Heapdump 분석 도구를 사용하여 Leak이 발생한 객체를
 - 오픈나루에 해당 파일을 전달하여 분석을 요청할 수도 있음
- Heapdump 분석 예시(타사 사례)

원인

JVM Heap & Perm Size

10/31 - 11/8 (약 1주)

11/8 - 11/21 (약 2주)

메모리 Leak이 주기적으로 반복되어 있던 것으로 추정됨 (WAS를 재기동해서 메모리가 복구됨)



진단 도구 사용법과 분석방법을 알아야 함

진단 도구 사용법

분석 방법

Application Performance Management



OPENMARU APM 진단도구 사용법

OPENMARU APM 대시보드 사용법

액티브 사용자수
(5분간 한번이라도 요청이 있었던 사용자수)

44개의 Pending이 쌓여 있음

20개 요청은 미사일 1개로 표시

개별 인스턴스 처리 현황

TPS
평균응답시간
액티브사용자

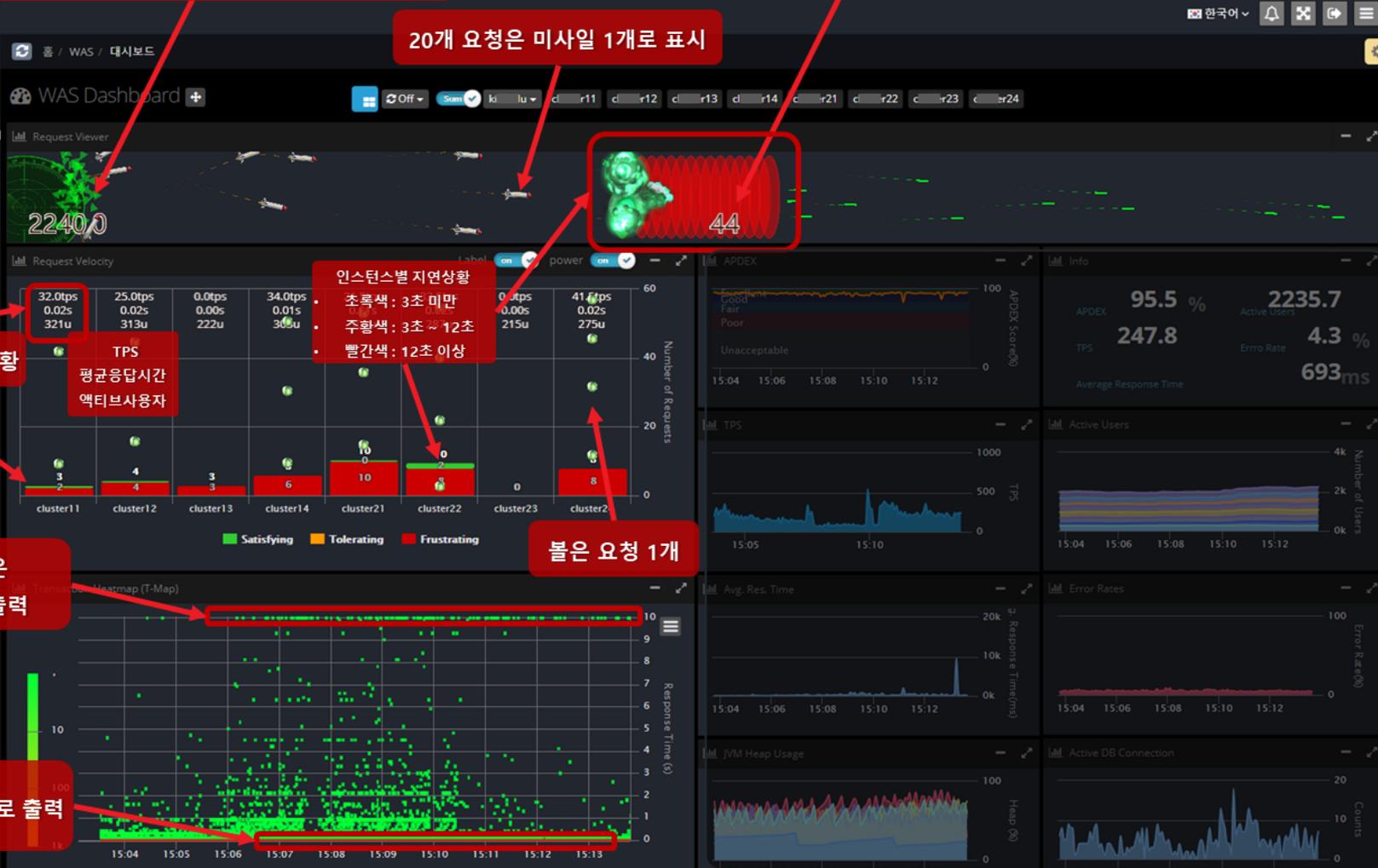
인스턴스별 지연상황
초록색: 3초 미만
주황색: 3초 ~ 12초
빨간색: 12초 이상

볼은 요청 1개

10초 이상은

10초라인에 출력

오류는 빨간색으로 출력



OPENMARU APM 대시보드 사용법



사용자 만족도 지수

(응답시간, 오류를 기준으로 사용자 서비스 만족도를 100점 만점으로 환산/높은 점수는 서비스가 좋은 상태)



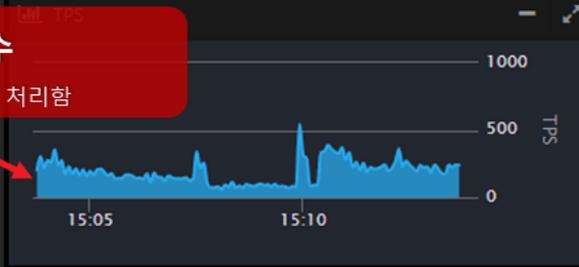
최근 주요 모니터링 지표

(APDEX, TPS, 액티브 사용자수, 오류율, 평균응답시간)



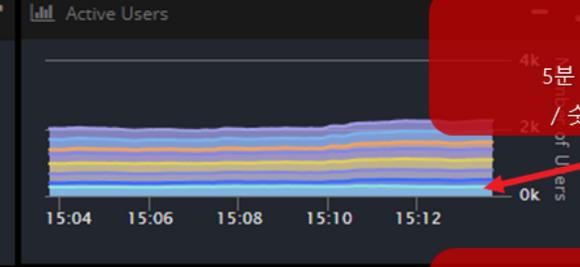
초당 처리건수

숫자가 크면 초당 많은 양 처리함



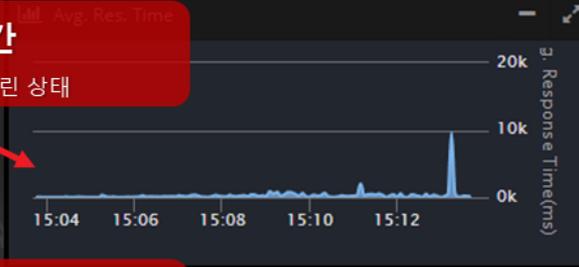
액티브 사용자수

5분 동안 요청이 있었던 사용자수 / 숫자가 크면 현재 사용자 많음



평균 응답시간

숫자가 크면 서비스가 느린 상태



오류율

5초 간격 요청건수 중의 오류 응답의 비율 / 숫자가 크면 서비스 오류가 많음



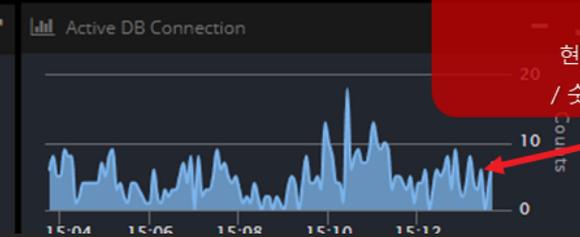
JVM Heap 사용량

100에 가까우면 주의가 필요



액티브 DB 연결

현재 사용중인 DB 연결의 갯수 / 숫자가 크면 DB 호출량이 많음



OPENMARU APM 대시보드 사용법



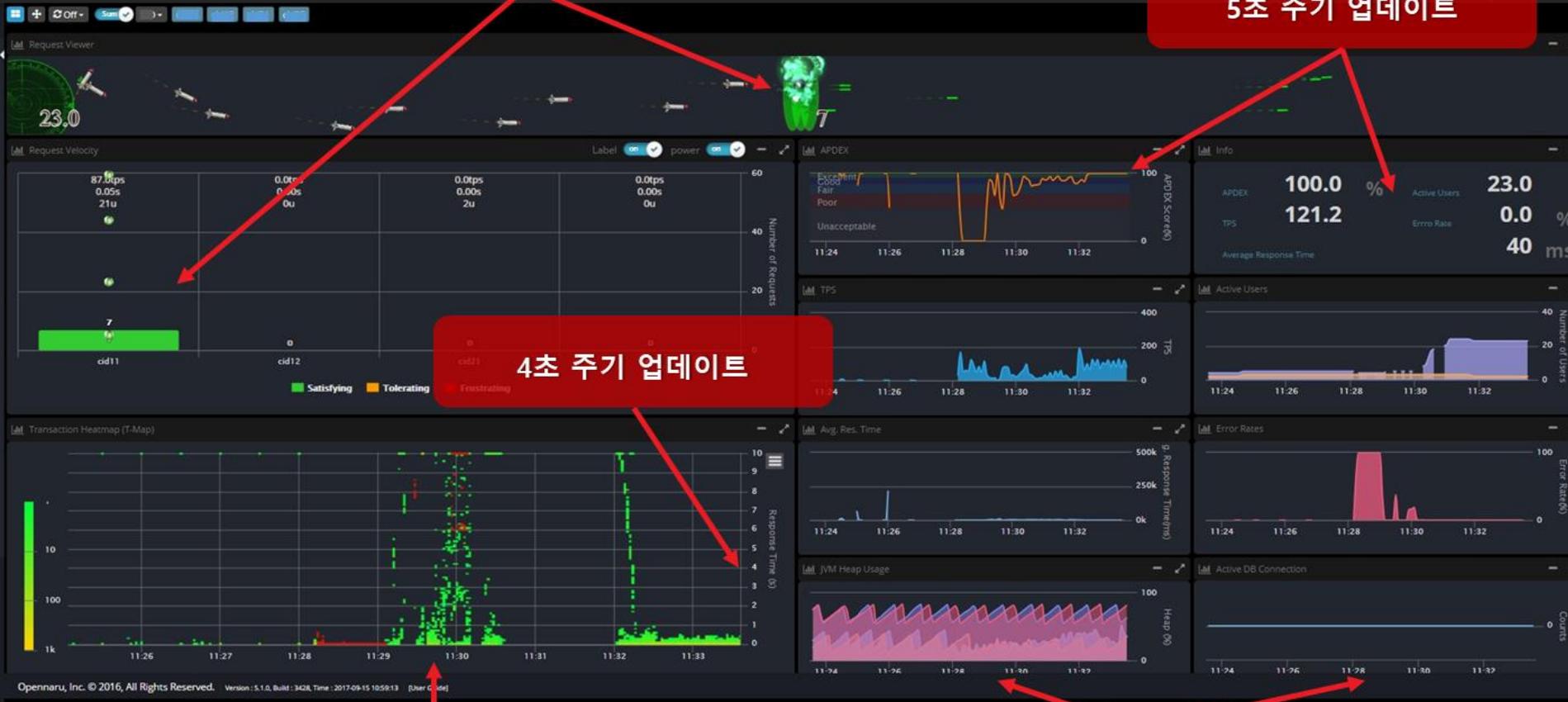
2초 주기 업데이트

5초 주기 업데이트

4초 주기 업데이트

10분 간의 데이터 출력

10분 간의 데이터 출력



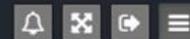
OPENMARU APM 대시보드 사용법



openmaru
APM



한국어



홈 / WAS / 대시보드

Sum CI t1 t2 :21 :22

Request Viewer



Request Velocity

Label on power on



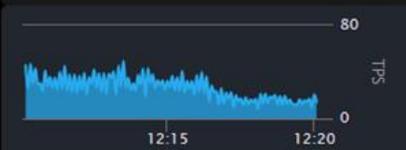
APDEX



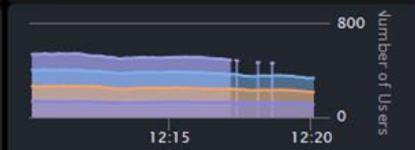
Info



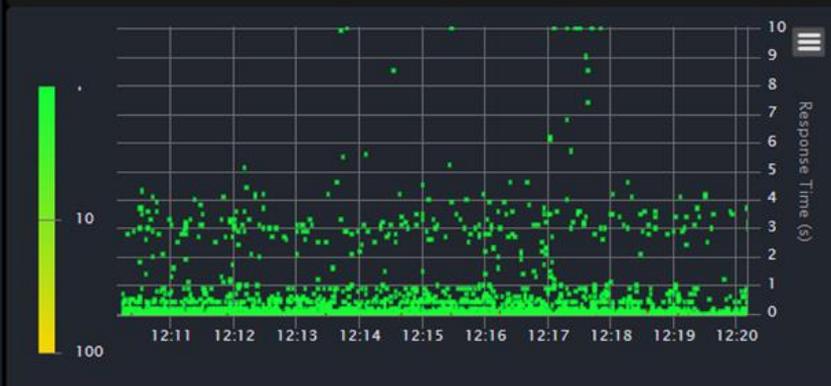
TPS



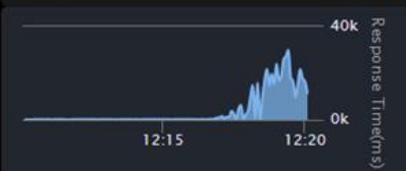
Active Users



Transaction Heatmap (T-Map)



Avg. Res. Time



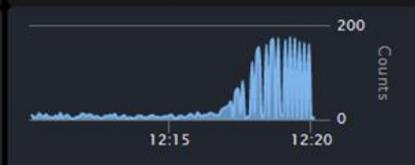
Error Rates



JVM Heap Usage



Active DB Connection



장애가 어제 발생했었다면?



openmaru

한국어

openmaru APM



Administrator

홈 / WAS / 애플리케이션 / kisaEdu / 지연 트랜잭션

WAS

대시보드

Instances

애플리케이션 그룹

kisaEdu

만족도 지수(APDEX)

실시간 요청 모니터링

트랜잭션 맵(T-Map)

초당처리수(TPS)

액티브 사용자수

지연 트랜잭션

평균응답시간

응답시간

JVM 메모리 비교

액티브 DB 연결

호출 통계

느린 URL 검색

오류율

오류 통계

실시간 요청 모니터링

액티브 사용자수

JVM 메모리 비교

WAS > kisaEdu >

Trend Analysis OFF Current History

Pending Transactions

higher values represent higher usages

Zoom 30m 1h 1d w 2w 1m All

From 2017-08-23 To 2017-08-23

대시보드의 지연 현황이 기록되어 있음

(satisfying : 3초 이내, tolerating : 3초 ~ 12초, frustrating : 12초 이상)

2017-08-23 16:20:00
●*-satisfying: 3.1
●*-tolerating: 14.9
●*-frustrating: 122.8
Total: 140.8

14:50 15:00 15:10 15:20 15:30 15:40 15:50 16:00 16:10 16:20 16:30

Number of Active Transactions

■*-satisfying ■*-tolerating ■*-frustrating

WAS 인스턴스 메뉴 구조



인스턴스 / 애플리케이션 그룹



The screenshot shows the Openmaru APM interface with the following navigation paths and data:

- Navigation Path:** Administrator > WAS > Web > System > 헬스체크 > 이벤트 > 보고서 > 설정
- Application Group View:**
 - Dashboard: 애플리케이션 그룹
 - Sub-menus: 실시간 요청 모니터링, 액티브 사용자수, JVM 메모리 비교
 - Directory (목록): [0]ALL, [1]EAP, [2]WS, [9]JTEST, eap64, eap72, jws, sows
- Business Monitoring (업무별 모니터링):**
 - Instances: [0]ALL
 - Metrics: 만족도 지수(APDEX), 실시간 요청 모니터링, 트랜잭션 맵(T-Map), 초당처리수(TPS), 액티브 사용자수, 지연 트랜잭션, 평균응답시간, 응답시간, JVM 메모리 비교, 액티브 DB 연결, 호출 통계, 느린 URL 검색, 오류율, 오류 통계
 - System Resources: 시스템 CPU 사용률, 시스템 메모리 사용률
- Instances Used in Business (업무에 사용된 WAS):**
 - Instances: ajws21, eap64-11, eap64-12, eap64-21, eap64-22, eap72-11, eap72-12, eap72-21, eap72-22, jws11, sows11
- WAS Instance Information (WAS 인스턴스 정보):**
 - ajws21
 - Server Information (서버 정보)
 - Application (애플리케이션)
 - Statistics (통계)
 - JVM
 - Data Source (데이터소스)
 - Thread Dump Analysis (스레드 덤프 분석)
 - Memory Space Analysis (메모리 객체 분석)
 - Open File Analysis (오픈파일 분석)
 - Network Status Analysis (네트워크 상태 분석)
- Container Environment (컨테이너 환경):**
 - Docker CPU 사용률
 - Docker 메모리 사용률

Annotations:

- Red arrows indicate the navigation path from the top left menu to the application group and instance views.
- Red boxes highlight key sections: '목록', '업무별 모니터링', '업무에 사용된 WAS', 'WAS 인스턴스 정보', and '컨테이너 환경'.
- A yellow box notes: '업무별로 통계가 가능한 데이터 메뉴' (Data menu available by business).
- Green boxes at the bottom indicate: '애플리케이션 그룹에 사용된 머신의 CPU/메모리 정보' (CPU/Memory info of machines used in application group) and '애플리케이션 그룹에 사용된 컨테이너의 CPU/메모리 정보' (CPU/Memory info of containers used in application group).

애플리케이션 그룹관리

설정

사용자 관리

사용자그룹 권한관리

애플리케이션 그룹관리

시스템 상태 정보

라이선스 관리

시스템 설정

리소스 Built-In : 에이전트에서 설정한 그룹명(변경 X)

User Defined : 사용자가 정의한 그룹(변경 O)

선택된 애플리케이션 그룹에 사용된 WAS 인스턴스들의 정보
숨기기 / 보이기 / 추가 / 삭제 가능
컨테이너 환경에서 폐기된 컨테이너 정보는 숨김으로 표시됨

애플리케이션 목록

#	Enable	Application Name	Built In	Type	First Date	Last Date	#	Enable	Ena...	Host Name	IP Address	Instance ID	Type	Status	First Date	Last D
1	<input checked="" type="checkbox"/>	[System Hosts]	Built-In	SYS			1	<input checked="" type="checkbox"/>	Show	test-was1	192.168.23.193	eap64-11	WAS	RUNNING	2020-01-17 21:10:23	2020-
2	<input checked="" type="checkbox"/>	[Web Server Hosts]	Built-In	WEB			2	<input checked="" type="checkbox"/>	Show	test-was1	192.168.23.193	eap64-12	WAS	RUNNING	2020-01-17 21:10:22	2020-
3	<input checked="" type="checkbox"/>	[0]ALL	User Defined	APP	2020-01-17 21:10:20	2020-01-20 23:48:21	3	<input checked="" type="checkbox"/>	Show	test-was1	192.168.23.193	eap72-11	WAS	RUNNING	2020-01-17 21:10:20	2020-
4	<input checked="" type="checkbox"/>	[1]EAP	User Defined	APP	2020-01-17 21:10:20	2020-01-20 23:48:21	4	<input checked="" type="checkbox"/>	Show	test-was1	192.168.23.193	eap72-12	WAS	RUNNING	2020-01-17 21:10:23	2020-
5	<input checked="" type="checkbox"/>	[2]JWS	User Defined	APP	2020-01-20 21:51:11	2020-01-20 22:49:55	5	<input checked="" type="checkbox"/>	Show	test-was2	192.168.23.194	eap64-21	WAS	RUNNING	2020-01-17 21:10:22	2020-
6	<input checked="" type="checkbox"/>	[9]TEST	User Defined	APP	2020-01-17 21:10:20	2020-01-20 23:48:21	6	<input checked="" type="checkbox"/>	Show	test-was2	192.168.23.194	eap64-22	WAS	RUNNING	2020-01-17 21:10:23	2020-
7	<input checked="" type="checkbox"/>	[eap64]	Built-In	APP	2020-01-17 21:10:22	2020-01-19 11:07:55	7	<input checked="" type="checkbox"/>	Show	test-was2	192.168.23.194	eap72-21	WAS	RUNNING	2020-01-17 21:10:23	2020-
8	<input checked="" type="checkbox"/>	[eap72]	Built-In	APP	2020-01-17 21:10:20	2020-01-20 23:48:21	8	<input checked="" type="checkbox"/>	Show	test-was2	192.168.23.194	eap72-22	WAS	RUNNING	2020-01-17 21:10:22	2020-
9	<input checked="" type="checkbox"/>	[jws]	Built-In	APP	2020-01-20 21:50:47	2020-01-20 22:50:48										
10	<input checked="" type="checkbox"/>	[sows]	Built-In	APP	2020-01-17 21:16:35	2020-01-19 11:37:54										

SYS : 시스템 에이전트
WEB : 웹 서버 모니터링 정보
APP : WAS 에이전트 그룹

애플리케이션 그룹 생성 방법

설정

사용자 관리

사용자그룹 권한관리

애플리케이션 그룹관리

시스템 상태 정보

라이선스 관리

시스템 설정

리소스

정규식으로 그룹 생성 - TEST_GROUP

WAS 인스턴스를 선택하는 정규식을 작성하여 사용자 정의 인스턴스 이름을 정규식으로 선택하여 그룹 생성

예제) 정규식 "^eap.*" 은 WAS 인스턴스 "eap11, eap12, tomcat11, tomcat12" 중에서 eap로 시작하는 인스턴스를 선택하는 정규식입니다.
<https://regex.com/> 사이트에서 정규식을 테스트할 수 있습니다.

Ok Cancel

애플리케이션 목록

모든 필드 검색 + 추가 정규식으로 그룹 보기 시간 범위 숨기기/보이기 모든 필드 검색 + 추가

#	Enable	Application Name	Build In	Type	First Date	Last Date	#	Enable	Ena	Ho	Name	I
1	<input checked="" type="checkbox"/>	[System Hosts]	Built-In	SYS								
2	<input checked="" type="checkbox"/>	[Web Server Hosts]	Built-In	WEB								
3	<input checked="" type="checkbox"/>	[0]ALL	User Defined	APP	2020-01-17 21:10:21							
4	<input checked="" type="checkbox"/>	[1]EAP	User Defined	APP	2020-01-17 21:10:21							
10	<input checked="" type="checkbox"/>	[sows]	Built-In	APP								
11	<input checked="" type="checkbox"/>	TEST_GROUP	User Defined	APP								

그룹이름 입력

우측 인스턴스 리스트에 추가 버튼 클릭

Add New Instance

#	Enable	IP	Instance ID	Type	#	Enable	IP	Instance ID	Type
1	Show	192.168.23.1...	sows11	WAS					
2	Show	192.168.23.1...	sows12	WAS					
3	Show	192.168.23.1...	eap64-11	WAS					
4	Show	192.168.23.1...	eap64-12	WAS					
5	Show	192.168.23.1...	eap72-11	WAS					
6	Show	192.168.23.1...	eap72-12	WAS					
7	Show	192.168.23.1...	jws11	WAS					
8	Show	192.168.23.1...	ajws21	WAS					
9	Show	192.168.23.1...	eap64-21	WAS					
10	Show	192.168.23.1...	eap64-22	WAS					
11	Show	192.168.23.1...	eap72-21	WAS					
12	Show	192.168.23.1...	eap72-22	WAS					

1-12 of 12

Ok Cancel

그룹에 포함될 인스턴스를 선택하여 추가

그래프 분석 방법(현재 10분 데이터)

다른 인스턴스의 같은 그래프를 보려면 선택

애플리케이션 그룹 선택

현재 10분간의 데이터 출력

현재 그래프
팝업/전체화면

실행할 수 있는 명령

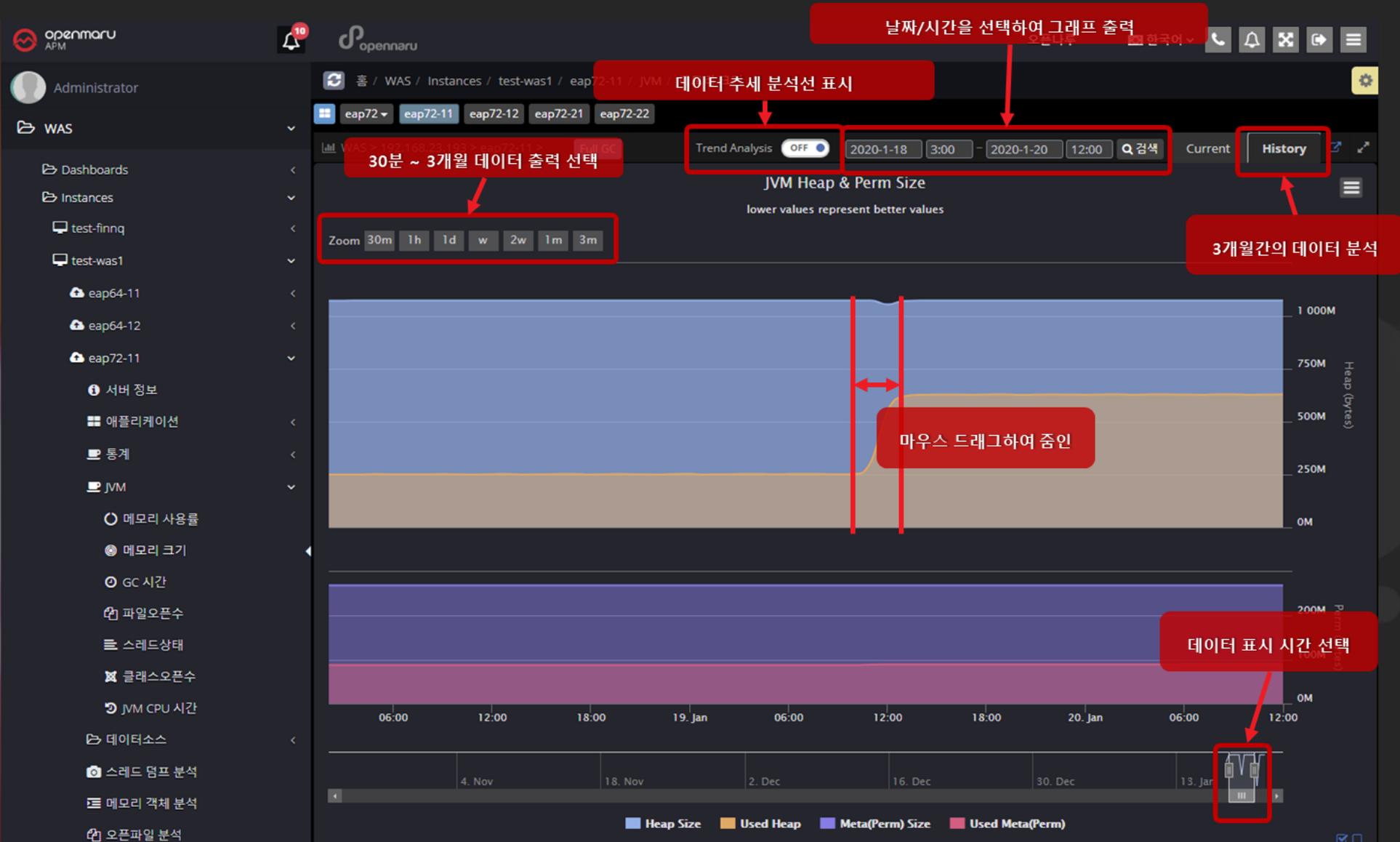
그래프 데이터를 이미지,
엑셀로 Export

클릭하면 그래프 항목 보기/숨기기 토글

전체 범례 보기/숨기기



그래프 분석 방법(과거 데이터)



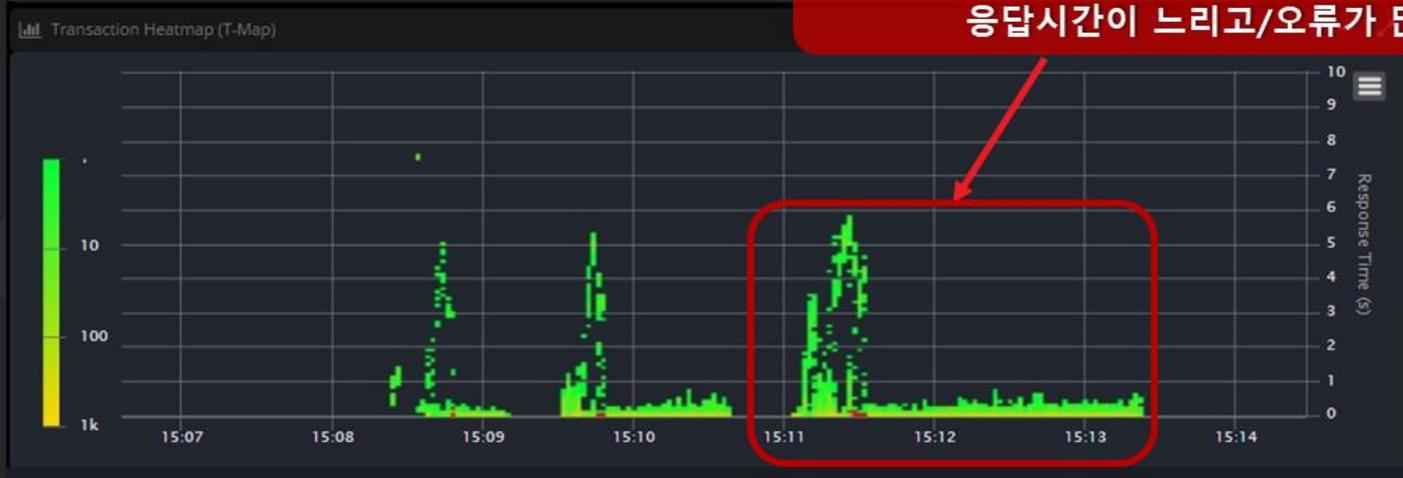
Transaction Heatmap(T-Map) 활용



openmaru

전

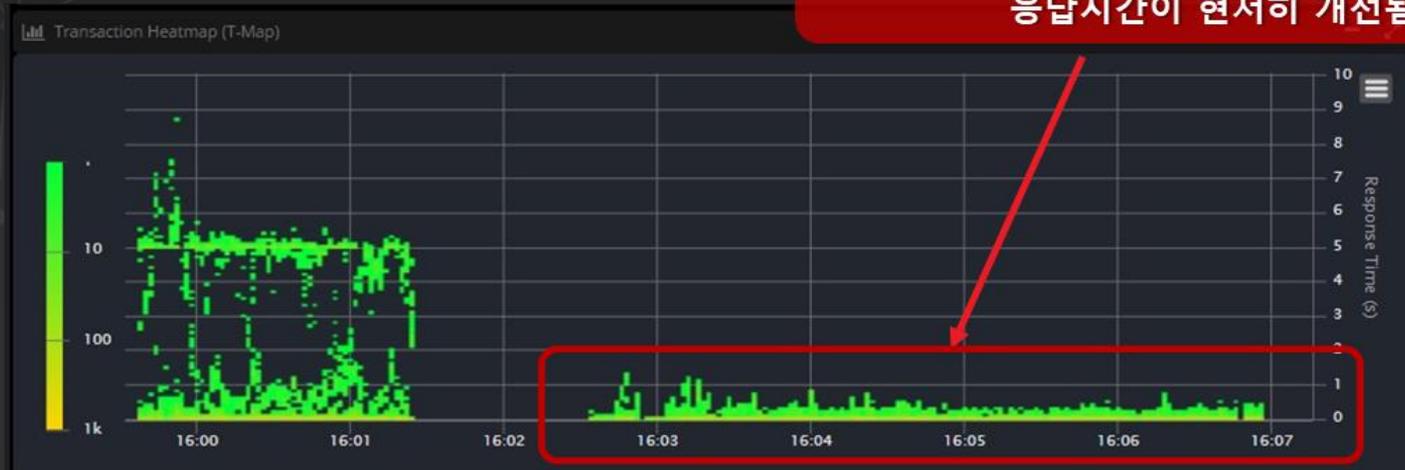
오류 코드 발생시 성능테스트
응답시간이 느리고/오류가 많음



Current : 현재 10분간의 데이터 출력

오류 코드 수정후 성능테스트
응답시간이 현저히 개선됨

후



트랜잭션 Heatmap(T-Map) 분석

날짜를 선택하여 하루 단위로 표시

날짜(시간) 범위로 출력

History Tab에서는 30초이상은
30초라인에 표시

Transaction Heatmap (T-Map)

lower values represent better values

마우스 드래그하면 상세정보 표시

빨간색 점 : HTTP 응답코드가
400,500이상인 경우

기준 시간을 정해 쿼리 등 응답시간을
꾸준히 튜닝해야 함

Transaction Details 분석 방법

Agent Type	Server IP	Client IP	Instance ID	URL	Status	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	98.118	98.118	instance11	/bms/d...eport.do	200	21,280	8,099	3	186	0	380.16	2019-03-11 17:14:40.597
WAS	98.118	98.118	instance11	/blg/message/messa...n.do	200	16,445	16,444	0	2	0	1.27	2019-03-11 17:16:07.433
WAS	98.118	98.118	instance11	/blg/message/messa...n.do	200	17,167	17,165	0	2	0	1.50	2019-03-11 17:16:07.561
WAS	98.118	98.118	instance11	/blg/message/messa...m.do	200	16,321	16,320	0	2	0	1.63	2019-03-11 17:15:50.672
WAS	98.118	98.118	instance11	/blg/message/messa...l.do	200	16,334	16,333	0	2	0	1.95	2019-03-11 17:16:07.433
WAS	98.118	98.118	instance11	/blg/message/messa...n.do	200	16,293	16,292	0	2	0	1.57	2019-03-11 17:16:07.561
WAS	98.118	98.118	instance11	/blg/message/messageAlarm.do	200	15,885	15,885	0	2	0	1.66	2019-03-11 17:16:08.267

초록색 : 메소드 수행시간 1초 미만
주황색 : 메소드 수행시간 1초 ~ 3초
빨간색 : 메소드 수행시간 3초 이상

[Num.]	[Start Time]	[Elapsed]	[%]	[Exclusi]	[A-Gab]	[CPUtime]	Method Call
[1]	[17:16:07.433]	[16,334]	[100]	[0]	[0]	[2.0]	+ org.springframework.web.servlet.FrameworkServlet.service()
[2]	[17:16:07.433]	[16,334]	[100]	[0]	[16,334]	[1.9]	+ org.springframework.web.servlet.DispatcherServlet.doService()
[3]	[17:16:07.433]	[16,334]	[100]	[1]	[16,333]	[1.3]	+ @RequestMapping onnara.blg.web.BlgMessageContoroller.messageAlarm()
[5]	[17:16:07.434]	[11,979]	[73]	[11,979]	[0]	[0.1]	+ org.jboss.jca.adapters.jdbc.WrapperDataSource.getConnection()
[7]	[17:16:19.413]	[0]	[0]	[0]	[0]	[0.1]	+ org.jboss.jca.adapters.jdbc.WrapperPreparedStatement.executeUpdate()
[8]	[17:16:19.413]	[0]	[0]	[0]	[0]	[0.0]	+ org.jboss.jca.adapters.jdbc.WrapperPreparedStatement.executeUpdate()
[9]	[17:16:19.413]	[0]	[0]	[0]	[0]	[0.0]	+ cubrid.jdbc.driver.CUBRIDPreparedStatement.execute()
[10]	[17:16:19.413]	[1]	[0]	[1]	[0]	[0.1]	+ cubrid.jdbc.driver.CUBRIDResultSet.next-close()
[11]	[17:16:19.414]	[0]	[0]	[0]	[0]	[0.0]	+ cubrid.jdbc.driver.CUBRIDConnection.commit()
[12]	[17:16:19.414]	[0]	[0]	[0]	[0]	[0.0]	+ org.jboss.jca.adapters.jdbc.WrapperConnection.close()
[13]	[17:16:19.414]	[2,687]	[16]	[0]	[2,687]	[0.1]	+ org.jboss.as.connector.subsystems.datasources.WildFlyDataSource.getConnection()
[14]	[17:16:19.414]	[2,687]	[16]	[2,687]	[0]	[0.1]	+ org.jboss.jca.adapters.jdbc.WrapperDataSource.getConnection()
[15]	[17:16:22.101]	[0]	[0]	[0]	[0]	[0.1]	+ org.jboss.jca.adapters.jdbc.WrapperConnection.prepareStatement()
[16]	[17:16:22.101]	[1,665]	[10]	[0]	[1,665]	[0.2]	+ org.jboss.jca.adapters.jdbc.WrapperPreparedStatement.executeUpdate()

DB 연결 Pool에서 Connection을 가져오는데 11초 소요됨

Transaction Details 메소드 수행시간 분석 방법

메소드 시작시간

전체 중 메소드
실행시간
비율

하위 트리 상의
메소드 수행시간
합계

메소드에서 사용한
CPU 시간(ms)

일련번호

메소드 실행시간(ms)

해당 메소드에서만
실행된 시간

[Num.]	Start Time	Elapsed	%	Exclusi	A-Gab	CPUTime	Method Call
[1]	[17:16:07.433]	16,334	100	0	0	2.0	+ org.springframework.web.servlet.FrameworkServlet.service()
[2]	[17:16:07.433]	16,334	100	0	16,334	1.9	+ org.springframework.web.servlet.DispatcherServlet.doService
[3]	[17:16:07.433]	16,334	100	1	16,333	1.3	+ @RequestMapping onnara.blg.web.BlgMessageContoroller.messa
[4]	[17:16:07.434]	11,979	73	0	11,979	0.1	+ org.jboss.as.connector.subsystems.datasources.WildFlyData
[5]	[17:16:07.434]	11,979	73	11,979	0	0.1	+ org.jboss.jca.adapters.jdbc.WrapperDataSource.getConnect
[6]	[17:16:19.413]	0	0	0	0	0.0	+ org.jboss.jca.adapters.jdbc.WrappedConnection.prepareStat
[7]	[17:16:19.413]	0	0	0	0	0.1	+ org.jboss.jca.adapters.jdbc.WrappedPreparedStatement.exec
[8]	[17:16:19.413]	0	0	0	0	0.0	> DB : URL: jdbc:cubrid:9..._db:::?a
[9]	[17:16:19.413]	0	0	0	0	0.0	> Query : SELECT COUNT(*) FROM bms_com_message_blg WHERE menu_type
[10]	[17:16:19.413]	1	0	1	0	0.1	> Mapped: SELECT COUNT(*) FROM bms_com_message_blg WHERE menu_type
[11]	[17:16:19.414]	0	0	0	0	0.0	+ org.jboss.jca.adapters.jdbc.CachedPreparedStatement.exec
[12]	[17:16:19.414]	0	0	0	0	0.0	+ cubrid.jdbc.driver.CUBRIDPreparedStatement.execute()
[13]	[17:16:19.414]	0	0	0	0	0.0	+ cubrid.jdbc.driver.CUBRIDResultSet.next-close()
[14]	[17:16:19.414]	0	0	0	0	0.0	> Fetch : [Fetch Count: 1, Gab Time: 0ms]
[15]	[17:16:19.414]	0	0	0	0	0.0	+ cubrid.jdbc.driver.CUBRIDConnection.commit()
[16]	[17:16:19.414]	0	0	0	0	0.0	+ org.jboss.jca.adapters.jdbc.WrappedConnection.close()

★

Exclusive Time을
먼저 확인함

Transaction Details 메소드 수행시간 분석 방법

```

=====
[Num.][ Start Time | Elapsed | % | Excludi | A-Gab | CPUTime]                Method Call
-----
[  1][17:16:07.433| 16,334| 100|          | 0.0| 0.0]                + org.springframework.web.servlet.FrameworkServlet.service()
[  2][17:16:07.433| 16,334| 100|          | 0.0| 0.0]                + org.springframework.web.servlet.DispatcherServlet.doService
[  3][17:16:07.433| 16,334| 100|          | 0.0| 0.0]                + @RequestMapping onnara.blg.web.BlgMessageContoroller.messa
[  4][17:16:07.434| 11,979| 73|          | 0.0| 0.0]                + org.jboss.as.connector.subsystems.datasources.WildFlyData
[  5][17:16:07.434| 11,979| 73|          | 0.0| 0.0]                + org.jboss.jca.adapters.jdbc.WrapperDataSource.getConnection
[  6][17:16:19.413| 0| 0| 0| 0| 0.0]                + org.jboss.jca.adapters.jdbc.WrappedConnection.prepareStatement
[  7][17:16:19.413| 0| 0| 0| 0| 0.1]                + org.jboss.jca.adapters.jdbc.WrappedPreparedStatement.execu
> DB : URL: jdbc:cubrid:9[redacted]_db::?a
> Query : SELECT COUNT(*) FROM bms_com_message_blg WHERE menu_type
, 14) AND SUBSTR(msg_title, -14)
> Mapped: SELECT COUNT(*) FROM bms_com_message_blg WHERE menu_type
, 14) AND SUBSTR(msg_title, -14)
[  8][17:16:19.413| 0| 0| 0| 0| 0.0]                + org.jboss.jca.adapters.jdbc.CachedPreparedStatement.execu
[  9][17:16:19.413| 0| 0| 0| 0| 0.0]                + cubrid.jdbc.driver.CUBRIDPreparedStatement.execute()
[ 10][17:16:19.413| 1| 0| 1| 0| 0.1]                + cubrid.jdbc.driver.CUBRIDResultSet.next-close()
> Fetch : [Fetch Count: 1, Gab Time: 0ms ]
[ 11][17:16:19.414| 0| 0| 0| 0| 0.0]                + cubrid.jdbc.driver.CUBRIDConnection.commit()
[ 12][17:16:19.414| 0| 0| 0| 0| 0.0]                + org.jboss.jca.adapters.jdbc.WrappedConnection.close()
    
```



쿼리 실행 시간을 표시

DB : 연결된 DB

Query : 실행된 쿼리문

Mapped PreparedStatement일 경우 바인딩된 쿼리문

쿼리한 데이터를 가져오는 시간을 표시

Fetch Count : 가져온 데이터 건수
resultset.next()후 close까지 실행시간

쿼리 튜닝이 필요한 경우

Agent Type	IP address	Instance ID	URL	Status	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	Ext...
WAS	2[REDACTED]	homepage11	/common/attachfile/FileDown.do	200	86,267	2	0	1	
WAS	2[REDACTED]	homepage11	/common/attachfile/FileDown.do	200	55,607	2	0	1	
WAS	2[REDACTED]	homepage11	/member/index.do	200	26,309	25,907	385	87	

```

[ 111][14:28:56.098| 0| 0| 0| 0| 0.0] + oracle.jdbc.driver.T4CDriverExtension.allocatePreparedStatement()
[ 112][14:28:56.098| 23,917| 91| 23,916| 0.7] + org.jboss.jca.adapters.jdbc.WrappedPreparedStatement.execute()
[ 113][14:28:56.099| 23,916| 91| 0| 23,916| 0.6] + org.jboss.jca.adapters.jdbc.CachedPreparedStatement.execute()
[ 114][14:28:56.099| 23,916| 91| 23,916| 0| 0.5] + oracle.jdbc.driver.OraclePreparedStatement.execute()
    > DB : URL: jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(LOAD_BALANCE=ON)(
OCOL=TCP)(HOST=[REDACTED])(PORT = 1521)))(CONNECT_DATA=(SERVER = DEDICATED)(SERVICE_NAME = [REDACTED]))
    > Query : /* memberDAO.mainBoardList */ SELECT BOARD_ID, REG_DT, BOARD_MST_ID,
') CONTENT FROM ( SELECT * FROM (SELECT BOARD_ID, REG_DT, BOARD_MST_ID, SUBSTR(TIT, 1, 36) TIT, CONTENT, (SELECT FILE_ID FROM TN_ATT_F
M = 1) FILE_ID FROM TN_BOARD TB WHERE BOARD_MST_ID = 'EhrdNotice' AND OPEN_YN = 'Y' ORDER BY BOARD_ID DESC) WHERE ROWNUM <= 5 UNION ALL
36) TIT, CONTENT, (SELECT FILE_ID FROM TN_ATT_FILE WHERE FILE_REF_ID = TB.BOARD_ID AND FILE_GRP = 'image1' AND ROWNUM = 1) FILE_ID FROM
R BY ORDER_NUM DESC) WHERE ROWNUM <= 5 UNION ALL SELECT * FROM (SELECT BOARD_ID, REG_DT, BOARD_MST_ID, SUBSTR(TIT, 1, 36) TIT, CONTENT,
OARD_ID = TFN.FILE_REF_ID AND TFN.FILE_GRP = 'file1' AND ROWNUM = 1 WHERE BOARD_MST_ID = 'DataEduNews' AND OPEN_YN = 'Y' ORDER BY ORDER
    > Mapped: /* memberDAO.mainBoardList */ SELECT BOARD_ID, REG_DT, BOARD_MST_ID,
') CONTENT FROM ( SELECT * FROM (SELECT BOARD_ID, REG_DT, BOARD_MST_ID, SUBSTR(TIT, 1, 36) TIT, CONTENT, (SELECT FILE_ID FROM TN_ATT_F
M = 1) FILE_ID FROM TN_BOARD TB WHERE BOARD_MST_ID = 'EhrdNotice' AND OPEN_YN = 'Y' ORDER BY BOARD_ID DESC) WHERE ROWNUM <= 5 UNION ALL
36) TIT, CONTENT, (SELECT FILE_ID FROM TN_ATT_FILE WHERE FILE_REF_ID = TB.BOARD_ID AND FILE_GRP = 'image1' AND ROWNUM = 1) FILE_ID FROM
R BY ORDER_NUM DESC) WHERE ROWNUM <= 5 UNION ALL SELECT * FROM (SELECT BOARD_ID, REG_DT, BOARD_MST_ID, SUBSTR(TIT, 1, 36) TIT, CONTENT,
OARD_ID = TFN.FILE_REF_ID AND TFN.FILE_GRP = 'file1' AND ROWNUM = 1 WHERE BOARD_MST_ID = 'DataEduNews' AND OPEN_YN = 'Y' ORDER BY ORDER
[ 115][14:29:20.391| 0| 0| 0| 0| 0.0] + oracle.jdbc.driver.InsensitiveScrollableResultSet.next-close()
    > Fetch : [Fetch Count: 15, Gab Time: 376ms ]

[ 116][14:29:20.391| 1| 0| 1| 0| 0.1] + org.jboss.jca.adapters.jdbc.WrappedConnection.close()
[ 117][14:29:20.392| 0| 0| 0| 0| 0.0] + com.ibatis.sqlmap.engine.impl.SqlMapClientImpl.openSession()
[ 118][14:29:20.392| 0| 0| 0| 0| 0.1] + org.jboss.jca.adapters.jdbc.WrapperDataSource.getConnection()
[ 119][14:29:20.392| 0| 0| 0| 0| 0.0] + org.jboss.jca.adapters.jdbc.WrappedConnection.prepareStatement()
    
```

Exclusive Time이 가장 긴 메소드

쿼리가 23.9초 동안 실행됨
데이터 Fetch 건수는 15개로 많지 않음

데이터 Fetch가 많은 경우



Instance ID	URL	Status	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch 건수
homepage14	/common/attachfile/FileDown.do	200	36,288	0	0	0
homepage14	/common/attachfile/FileDown.do	200	58,465	0	0	0
homepage14	/common/attachfile/FileDown.do	200	47,184	3	0	1
homepage14	/common/attachfile/FileDown.do	200	46,991	2	0	1
homepage14	/member/mobile/select/SelectBoardView.do	200	82,793	481	15,740	264,056
homepage14	/member/mobile/select/SelectBoardView.do	200	28,983	581	15,957	264,056
homepage14	/member/mobile/select/SelectBoardView.do	200	46,552	576	25,220	264,056
homepage14	/member/mobile/select/SelectBoardView.do	200	138,530	606	66,329	264,056

일시 : 11월 30일 21시 55분

/member/mobile/select/SelectBoardView.do

URL 에서 Too Many Resultset Fetch 발생

DB Resultset Fetch 건수가 264,056건

Warning Message

- Too many resultset fetch [count:100000, elapsed:28647]
- Too many resultset fetch [count:200000, elapsed:45694]

데이터 Fetch 건수가 많으면 10만건 단위로 현재까지 소요시간을 표시함

Method Traces

```

=====
[Num.][ Start Time | Elapsed | % | Exclud | A-Gab | CPUTime]          Method Call
-----
[ 1][20:53:56.120 | 138,530 | 100 |      2 |      0 | 7,843.9] + org.apache.catalina.connector.CoyoteAdapter.service()
[ 2][20:53:56.121 | 138,528 | 100 | 66,333 | 72,195 | 7,842.8] + org.springframework.web.servlet.DispatcherServlet.doService()
[ 3][20:53:56.122 |      0 |  0 |      0 |      0 |  0.0] + com.ibatis.sqlmap.engine.impl.SqlMapExecutorDelegate.execute()
[ 4][20:53:56.123 |      0 |  0 |      0 |      0 |  0.0] + org.apache.commons.dbcp.BasicDataSource.getConnection()
[ 5][20:53:56.123 |      0 |  0 |      0 |      0 |  0.0] + org.apache.commons.dbcp.PoolableConnection.borrowConnection()
[ 6][20:53:56.123 |      0 |  0 |      0 |      0 |  0.1] + org.apache.commons.dbcp.DelegatingPreparedStatement.prepareStatement()
[ 7][20:53:56.123 |      0 |  0 |      0 |      0 |  0.0] + oracle.jdbc.driver.T4CDriver.newPreparedStatement()
[ 8][20:53:56.124 | 606 |  0 |      0 | 606 |  0.5] + org.apache.commons.dbcp.DelegatingPreparedStatement.execute()
[ 9][20:53:56.124 | 606 |  0 |      0 | 606 |  0.4] + oracle.jdbc.driver.OraclePreparedStatement.execute()
    > DB : jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(LOAD_BALANCE=ON)(ADDRESS=(PROTOCOL = TC
    > Query : /* eduschCourseDAO.selectPopuList */ SELECT A.COURSESEQNO , B.COURSENAME , A.NAME , A.SEX
    IN(0, 1, 9) ORDER BY A.REGDATE DESC
    > Mapped: /* eduschCourseDAO.selectPopuList */ SELECT A.COURSESEQNO , B.COURSENAME , A.NAME , A.SEX
    IN(0, 1, 9) ORDER BY A.REGDATE DESC
[10][20:55:03.059 |      0 |  0 |      0 |      0 |  0.0] + oracle.jdbc.driver.OracleResultSetImpl.next-close()
    > Fetch : [Fetch Count: 264056, Gab Time: 66,329ms ]
[11][20:55:03.059 |      0 |  0 |      0 |      0 |  0.1] + org.apache.commons.dbcp.PoolableConnection.close()
[12][20:55:03.060 | 71,589 | 52 |      3 | 71,586 | 2,192.3] + org.apache.jasper.servlet.JspServlet.service()
[13][20:55:03.063 | 71,586 | 52 | 71,586 |      0 | 2,188.7] + org.apache.jsp.WEB_002dINF.jsp.egovFramework.member.mobile.select.SelectBoardView_jsp._jsp
  
```

쿼리 수행시간은 606ms

ResultSet Fetch 건수가 264,056건으로 66.3초 수행되었음

Transaction Details의 분석 예시



Transactions > 2017-07-03 00:00:00 ~ 2017-07-04 00:00:00 > 0ms ~ 999999ms

응답코드

데이터베이스 관련 수행시간/데이터 건수 등

Agent Type	IP address	Instance ID	URL	Status	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	172.20.0.51	school11	/manager/monitor/status/excel.list.do	500	542	207	299	156	0	259.39	2017-07-03 08:43:18.569
WAS	172.20.0.51	school11	/school/lectureTotal/ajax.lectureList.do	500	396	35	0	2	0	30.35	2017-07-03 11:21:15.580
WAS	172.20.0.04	school11	/school/lectureTotal/ajax.lectureList.do	500	281	38	0	2	0	32.70	2017-07-03 11:23:51.715
WAS	172.20.0.51	school11	/school/lectureTotal/ajax.lectureList.do	500	264	58	0	2	0	30.01	2017-07-03 11:22:22.902
WAS	172.20.0.04	school121	/school/lectureTotal/ajax.lectureList.do	500	261	40	0	2	0	30.78	2017-07-03 11:24:31.148
WAS	172.20.0.51	school111	/school/lectureTotal/ajax.lectureList.do	500	257	39	0	2	0	29.75	2017-07-03 11:23:52.031
WAS	172.20.0.04	school121	/school/lectureTotal/ajax.lectureList.do	500	256	39	0	2	0	30.78	2017-07-03 11:22:23.456
WAS	172.20.0.04	school121	/school/lectureTotal/ajax.lectureList.do	500	255	38	0	2	0	30.37	2017-07-03 11:23:50.406

애플리케이션 검색 파라미터에 SQL 쿼리를 입력하여 공격 시도하고 있음

해당 페이지로 이동

Transaction Detail	Trace	StackTrace
Name	Value	
Request URL	/school/lectureTotal/ajax.lectureList.do	View URL
Request Host	meopennaru.kr	View Page
Client IP	211.253.133.37	User Location
Start Time	2017-07-03 11:21:15.580	
Duration (ms)	396	
JDBC Time (ms)	396	
Thread Name	default-task-42	
Agent	sqlmap/1.0.9.1#dev (http://sqlmap.org)	
Params	currentPageNo=1&recordCountPerPage=9&schoolGrd=&searchStartDate=2017-07-03%27%29%20UNION%20ALL%20SELECT%20NULL%2CNULL%2CNULL%2CNULL%2CNULL%2CNULL%2CNULL%20hmCN&searchEndDate=2017-07-11&grpNo=&lectTime=&lectType=&jobChrctList=&jobNo=&lectStatCd=101543&orderBy=asc&listType=1&consonantsVal=&searchKey=%EA%B5%90EB%8F%84%EA%B4%80&isMore=false&ms=%5Bobject%20Object%5D&_=1499047901941	
Status Code	500	
End Time	2017-07-03 11:21:15.976	
CPU Time (ms)	30.35	
Latency (ms)	12.905	
Thread ID	298	
Instance ID	school11	
Transaction ID	15d0640493f-6fee1c1d970b75a5da7	

IP로 사용자 위치파악

sqlmap tool을 사용함

사용자 IP는 모두 같아 분석 불가
Load Balancer에서 'X-Forwarded-For' 헤더를 설정하면 Client IP를 수집할 수 있음

SQL 쿼리의 데이터 건수가 많음



Transactions > 2019-09-04 09:33:39 ~ 2019-09-04 11:59:29 > 29122ms ~ 9999999ms

Quick Service

Export to Excel

tid :

Agent Type	Server IP	Client IP	Instance ID	URL	Status	War	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	9[redacted]7	223.63.15.201	lwis_1	/crosseditor/binary/flash/000001/190625_%E8%98%	500	1	318,335	0	0	0	0	129.38	2019-09-04 09:45:18.058
WAS	9[redacted]7	10.182.110.141	lwis_1	/index.jsp	500	9	732,521	53,912	641,815	821,894	0	91,813.11	2019-09-04 09:52:25.447
WAS	9[redacted]7	210.90.46.250	lwis_1	/rest/bo/vw/target/mout/select	200	0	57,020	57,020	0	1	0	19.30	2019-09-04 10:40:04.339
WAS	9[redacted]7	210.90.46.250	lwis_1	/rest/bo/vw/link/hppy/req/inq_request	200	0	60,249	9	1	2	60,194	22.56	2019-09-04 10:55:46.586
WAS	9[redacted]7	210.90.46.250	lwis_1	/rest/bo/vw/link/hppy/req/inq_request	200	0	54,314	8	0	2	53,818	326.73	2019-09-04 10:57:44.126
WAS	9[redacted]7	210.90.46.250	lwis_1	/rest/bo/vw/link/hppy/req/inq_request	200	0	60,280	8	0	2	60,225	24.11	2019-09-04 10:59:11.892
WAS	9[redacted]7	210.90.46.250	lwis_1	/rest/bo/vw/visit/consult/update_hblink	200	0	60,293	13	0	3	60,225	32.56	2019-09-04 11:05:40.509
WAS	9[redacted]7	210.90.46.250	lwis_1	/rest/bo/vh/old/household/inout/select	200	0	103,688	103,665	1	6	0	17.87	2019-09-04 11:38:34.908

9월 4일 9시 52분경 index.jsp 애플리케이션에서 DB에서 821,894건의 데이터를 가져와 메모리 점유

Transaction Detail

Trace

StackTrace

Name	Value
Request URL	POST /index.jsp View URL
Request Host	9[redacted]8080 View Page
Client IP	10.182.110.141 User Location
Start Time	2019-09-04 09:52:25.447
Duration (ms)	732,521
JDBC Time (ms)	53,912
Thread Name	webtob2-hth0-31
IP	98.33.2.87
Agent Type	WAS

Name	Value
Params	
Status Code	500
User Agent	Apache-HttpClient/4.3.3 (java 1.5)
End Time	2019-09-04 10:04:37.968
CPU Time (ms)	91,813.11
Latency (ms)	0
Thread ID	215
Instance ID	lwis_1
Transaction ID	16cf9c2bb04-166ab504e47e31ae4933

Error Message

```
Request processing failed; nested exception is org.apache.jasper.runtime.JspWriterException
at jeus.util.net.PipeOutputStream.pipeWrite(PipeOutputStream.java:-2)
at jeus.util.net.PipeOutputStream.write(PipeOutputStream.java:86)
at jeus.util.UnsynchronizedByteArrayOutputStream.flush(UnsynchronizedByteArrayOutputStream.java:47)
at jeus.servlet.engine.io.BufferedOutputAdaptor.internalFlush(BufferedOutputAdaptor.java:152)
at jeus.servlet.engine.io.BufferedOutputAdaptor.internalFlush(BufferedOutputAdaptor.java:76)
at jeus.servlet.engine.io.ProtocolOutputAdaptor.flush(ProtocolOutputAdaptor.java:589)
at jeus.servlet.engine.io.BufferedOutputAdaptor.prepareBuffer(BufferedOutputAdaptor.java:27)
```

데이터를 많이 Fetch한 쿼리 확인



Transactions > 2019-09-04 09:33:39 ~ 2019-09-04 11:59:29 > 29122ms ~ 9999999ms

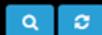
Quick Service

Export to Excel

tid :

Q

Agent Type	Server IP	Client IP	Instance ID	URL	Status	War	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	9.7	223.63.15.201	lwis_1	/crosseditor/binary/flashes/000001/190625_%EB%	500	1	318,335	0	0	0	0	129.38	2019-09-04 09:45:18.058
WAS	5.7	10.182.110.141	lwis_1	/index.jsp	500	9	732,521	53,912	641,815	821,894	0	91,813.11	2019-09-04 09:52:25.447



Page 1 of 1

View 1 - 9 of 9

9월 4일 9시 52분경 index.jsp에서 DB에서 821,894건의 데이터를 가져온 SQL 쿼리는 다음과 같음

Transaction Detail

Trace

StackTrace

```
AS CHRGM, F_AD_01_CMMNCDNM(SUBSTR(A.SVC_CD, 0, 2), A.SVC_CD) || '/' || (SELECT SVC_ACT_CODE FROM AD_CMMN_CD WHERE GROUP_CD = 'AD0004' AND CD = '02') AS BSNS_SE_NM, '완료' AS CNSLT_RSLT_NM FROM OC_SERVICE_ACT A WHERE A.TRGTER_ID = 'VW000793171' A ORDER BY DECODE(VISITDE, NULL, VISIT_PARDE, VISITDE) DESC
[ 25][09:52:25.547] 0| 0| 0| 0| 0.0] + oracle.jdbc.driver.OracleResultSetImpl.next-close()
> Fetch : [Fetch Count: 2, Gab Time: 0ms ]
[ 26][09:52:25.548] 0| 0| 0| 0| 0.1] + oracle.jdbc.driver.T4CPreparedStatement.allocatePreparedStatement()
[ 27][09:52:25.548] 52,266| 7| 52,266| 0| 0.4] + oracle.jdbc.driver.OraclePreparedStatement.execute()
> DB : URL: jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(PORT=1621)(HOST=9.7.)))(CONNECT_DATA=(SID=spddb2))
> Query : SELECT TO_CHAR(A.CNSLTDE, 'YYYY-MM-DD') AS CNSLTDE, C.TRGTER_NM, A.CNSLT_MTH, F_AD_01_CMMNCDNM('VW0005', A.CNSLT_MTH) AS CNSLT_MTH_N
M, A.CNSLT_ID, (SELECT MBER_NM FROM AD_MBER_INFO WHERE MBER_ID = A.REG_ID) CNSLT_NM, A.CNSLT_ODR, D.HSHLD_REGNO, A.TRGTER_ID, A.CNSLT_CN_C FROM VW_CNS_RECORD A JOIN VW_INFO B ON A.TRGTER_ID = B.TRGTER_ID
LEFT JOIN TP_INFO C ON B.TRGTER_ID = C.TRGTER_ID LEFT JOIN TP_HSHLD_MBER D ON C.TRGTER_ID = D.TRGTER_ID WHERE D.HSHLD_MBER_ENDDE IS NULL
ORDER BY A.CNSLTDE DESC
> Mapped: SELECT
TO_CHAR(A.CNSLTDE, 'YYYY-MM-DD') AS CNSLTDE
, C.TRGTER_NM
, A.CNSLT_MTH
, F_AD_01_CMMNCDNM('VW0005', A.CNSLT_MTH) AS CNSLT_MTH_NM
, A.CNSLT_ID
, (SELECT MBER_NM FROM AD_MBER_INFO WHERE MBER_ID = A.REG_ID) CNSLT_NM
, A.CNSLT_ODR
, D.HSHLD_REGNO
, A.TRGTER_ID
, A.CNSLT_CN_C
FROM VW_CNS_RECORD A
JOIN VW_INFO B ON A.TRGTER_ID = B.TRGTER_ID
JOIN TP_INFO C ON B.TRGTER_ID = C.TRGTER_ID
LEFT JOIN TP_HSHLD_MBER D ON C.TRGTER_ID = D.TRGTER_ID
WHERE D.HSHLD_MBER_ENDDE IS NULL
ORDER BY A.CNSLTDE DESC
> CALLAC:
at oracle.jdbc.driver.OraclePreparedStatement.execute(null:-1)
at sun.reflect.GeneratedMethodAccessor194.invoke(null:-1)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
at java.lang.reflect.Method.invoke(Method.java:606)
at org.apache.ibatis.logging.jdbc.PreparedStatementLogger.invoke(PreparedStatementLogger.java:62)
at com.sun.proxy.$Proxy1393.execute(null:-1)
at org.apache.ibatis.executor.statement.PreparedStatementHandler.query(PreparedStatementHandler.java:59)
at org.apache.ibatis.executor.statement.RoutingStatementHandler.query(RoutingStatementHandler.java:73)
at org.apache.ibatis.executor.ReuseExecutor.doQuery(ReuseExecutor.java:57)
at org.apache.ibatis.executor.BaseExecutor.queryFromDatabase(BaseExecutor.java:267)
at org.apache.ibatis.executor.BaseExecutor.query(BaseExecutor.java:137)
```

쿼리가 느린 경우(30초이상) 어떤 메소드에서 호출했는지 파악할 수 있도록 Stack Trace를 남겨놓음

호출오류 파악 : undefined가 호출됨



Transactions > 2019-09-06 09:00:00 ~ 2019-09-06 09:25:30 > 0ms ~ 535ms

Quick Service

Export to Excel

tid :

Agent Type	Server IP	Client IP	Instance ID	URL	Status	War	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	98.33.2.87	210.200.40.200	lwis_2	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.00	2019-09-06 09:15:07.001
WAS	98.33.2.87	210.200.40.50	lwis_2	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.47	2019-09-06 09:15:16.373
WAS	98.33.2.87	210.200.40.50	lwis_1	/rest/bo/vw/target/hshld/insert_hshld	200	0	510	398	1	5	0	27.29	2019-09-06 09:15:31.998
WAS	98.33.2.87	210.200.40.50	lwis_2	/sbexcel/down.do	500	1	174	0	0	0	0	76.00	2019-09-06 09:15:35.614
WAS	98.33.2.87	210.200.40.50	lwis_1	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.34	2019-09-06 09:15:42.671
WAS	98.33.2.87	210.200.40.50	lwis_2	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.22	2019-09-06 09:15:56.748
WAS	98.33.2.87	210.200.40.50	lwis_2	/bo/vw/visit/consult/undefined	404	0	3	0	0	0	0	1.37	2019-09-06 09:16:01.324
WAS	98.33.2.87	210.200.40.50	lwis_1	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.57	2019-09-06 09:16:07.644



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View 1 - 65 of 65

Transaction Detail

Trace

StackTrace

Name	Value	Name	Value
Request URL	GET /bo/vw/visit/consult/undefined View URL	Params	
Request Host	wis.eseoul.go.kr View Page	Status Code	404
Client IP	210.200.40.50 User Location	Response Size	0
Start Time	2019-09-06 09:15:42.671	CPU Time (ms)	1.34
Duration (ms)	2	Latency (ms)	0
JDBC Time (ms)	0	Thread Name	webtob-hth0-36 [lwis_1-171]
Thread Name	webtob-hth0-36 [lwis_1-171]	Thread ID	171
IP	98.33.2.87	Instance ID	lwis_1
Agent Type	WAS	Transaction ID	16d03eddb42-2b8d882d45a710572ed3

Javascript의 값이 정의되지 않은 채 URL을 호출하는 경우가 있어 /bo/vw/visit/consult/undefined가 호출됨

Method Traces

[Num.]	[Start Time]	[Elapsed]	[%]	[Exclusi]	[A-Gab]	[CPUTime]	Method Call
[1]	[09:15:42.671]	[2]	[100]	[0]	[0]	[1.3]	+ jeus.servlet.servlets.ResourceServlet.execute()
[2]	[09:15:42.671]	[2]	[100]	[0]	[2]	[1.0]	+ kr.go.seoul.lwis.filter.HeadMetaFilter.doFilter()
[3]	[09:15:42.671]	[2]	[100]	[0]	[2]	[0.9]	+ kr.co.weeds.wt.wal.servlet.LogRedirector.doFilter()
[4]	[09:15:42.671]	[2]	[100]	[2]	[0]	[0.9]	+ kr.co.weeds.wt.wal.servlet.LogMapper.doFilter()

오류 메시지 확인 : 없는 파일을 요청함(500오류)



Transactions > 2019-09-06 09:00:00 ~ 2019-09-06 09:25:30 > Oms ~ 535ms

Quick Service

Export to Excel

tid :



Agent Type	Server IP	Client IP	Instance ID	URL	Status	War	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	9[redacted]7	21[redacted]250	lwis_1	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.20	2019-09-06 09:18:04.920
WAS	9[redacted]7	21[redacted]250	lwis_1	/sbexcel/down.do	500	1	158	0	0	0	0	78.47	2019-09-06 09:18:19.046
WAS	9[redacted]7	21[redacted]250	lwis_1	/bo/vw/visit/consult/undefined	404	0	2	0	0	0	0	1.07	2019-09-06 09:18:31.253
WAS	9[redacted]7	21[redacted]250	lwis_1	/sbexcel/down.do	500	1	184	0	0	0	0	76.43	2019-09-06 09:18:39.755
WAS	9[redacted]7	21[redacted]250	lwis_1	/sbux/js/sbgr.../2_5/SBGrid/css/plugins/font/conte	404	0	2	0	0	0	0	1.78	2019-09-06 09:19:04.970
WAS	9[redacted]7	21[redacted]250	lwis_2	/kcase/KCaseAgent_Installer_v1.3.6.exe	200	0	502	0	0	0	0	12.03	2019-09-06 09:19:37.590
WAS	9[redacted]7	21[redacted]250	lwis_1	/rest/bo/vw/target/hshld/insert_hshld	200	0	512	377	1	5	0	24.26	2019-09-06 09:19:57.741



Page [redacted] of 1

View 1 - 65 of 65

Transaction Detail

Name	Value	Name	Value
Request URL	POST /sbexcel/down.do View URL	Params	
Request Host	wis.esoul.go.kr View Page	Status Code	500
Client IP	210.90.46.23 View Location	Browser	Trident/7.0; rv:11.0) like Gecko
Start Time	2019-09-06 09:18:39.755	Response Size	5,939
Duration (ms)	184	CPU Time (ms)	76.43
JDBC Time (ms)	0	Latency (ms)	0
Thread Name	webtob-hth0-17 [lwis_1-152]	Thread ID	152
IP	98[redacted]	Instance ID	lwis_1
Agent Type	WAS	Transaction ID	16d03f08eff-811a78a0192cb006c17

Error Message

```
Request processing failed; nested exception is java.lang.RuntimeException: java.io.IOException: 그런 파일이나 디렉터리가 없습니다
at java.io.tmpfile.SystemTempCreator.createTempFileExclusively(SystemTempCreator.java:12)
at java.io.File.createTempFile(File.java:2001)
at org.apache.poi.util.TempFile$DefaultTempFileCreationStrategy.createTempFile(TempFile.java:105)
at org.apache.poi.util.TempFile.createTempFile(TempFile.java:60)
at org.apache.poi.xssf.streaming.SheetDataWriter.createTempFile(SheetDataWriter.java:80)
at org.apache.poi.xssf.streaming.SheetDataWriter.(SheetDataWriter.java:63)
at org.apache.poi.xssf.streaming.SheetDataWriter.(SheetDataWriter.java:68)
```

/sbexcel/down.do URL에서 없는 파일을 요청하여 '그런 파일이나 디렉터리가 없습니다' 오류메시지가 출력되는 경우가 있음

T-Map Trace 확인 - JSP 컴파일 오류 확인



OpenNaru

Agent Type	Server IP	Client IP	Instance ID	URL	Status	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	10.156	105.73.8	instance12	/bms/dct/docpathview.do	500	23,749	0	0	0	0	13.64	2018-01-24 10:21:22.731
WAS	10.156	105.1216	instance12	/bms/dct/viewreport.do	500	1,754	405	5	57	0	194.00	2018-01-24 11:18:58.449
WAS	10.156	105.3.23	instance11	/bms/dctenf/BmsDctEnfMultiAccept.do	500	1,327	258	2	44	0	57.52	2018-01-24 10:54:35.703
WAS	10.157	105.107	instance22	/bms/wct/sendExcel.do	500	1,257	55	7	45	0	105.93	2018-01-24 09:21:12.665
WAS	10.156	105.1216	instance12	/bms/dctenf/BmsDctEnfMultiAccept.do	500	1,108	305	4	47	0	55.80	2018-01-24 10:37:26.892
WAS	10.157	105.14	instance22	/bms/dctenf/BmsDctEnfMultiAccept.do	500	1,063	259	4	44	0	64.33	2018-01-24 08:50:43.556
WAS	10.157	105.9	instance22	/bms/com/todoportlet.do	500	1,058	1,037	0	40	0	35.89	2018-01-24 08:33:50.325
WAS	10.156	105.1216	instance12	/bms/dctenf/BmsDctEnfMultiAccept.do	500	964	191	4	41	0	49.24	2018-01-24 10:32:51.798
WAS	10.156	105.129	instance12	/bms/dctenf/BmsDctEnfMultiAccept.do	500	952	339	1	38	0	86.03	2018-01-24 07:45:50.215
WAS	10.156	105.1216	instance12	/bms/dctenf/BmsDctEnfMultiAccept.do	500	943	155	2	47	0	49.16	2018-01-24 10:37:06.733

XXXSetOReportPathCU.jsp의 31번째 라인에서 오류 발생

Name	Value	Name	Value
Request URL	POST /bms/dct/docpathview.do View URL	Params	
Request Host	105.55 View Page	Status Code	500
Client IP	105.8 User Location	User Agent	Mozilla/5.0 (Windows NT 6.1; Trident/7.0; rv:11.0) like Gecko
Start Time	2018-01-24 10:21:22.731	End Time	2018-01-24 10:21:46.480
Duration (ms)	23,749	CPU Time (ms)	13.64
JDBC Time (ms)	0	Latency (ms)	0
Thread Name	http-thread-pool-threads - 44	Thread ID	383
IP	105.27.1156	Instance ID	instance12
Agent Type	WAS	Transaction ID	16125bd9383-1b7db34408666c5413ec

```

JBWEB004038: An exception occurred processing JSP page /WEB-INF/jsp/dct/submit/BmsSetOReportPathCU.jsp at line 31
28:  boolean isFormPath  = param.getBoolean("formFlag");                //보그경로로 지정하면 여부
29:  boolean isAdmin    = param.getBoolean("adminFlag") && (loginVO.getVGroup().contains("4001") || loginVO.getVGroup().contains("4002"));
30:                                                              //관리자 권한여부
31:  int currentOrder   = !isGrpPath && !isFormPath ? param.getInt("currentOrder") : 1;                //처리된 경ルス
32:  int lastOrder      = !isGrpPath && !isFormPath ? param.getInt("lastOrder", 1) : 1;                //처리완료된 마지막 보그경로
33:  int orgPathLength  = orgPath.length();
  
```

Runtime 오류 : OutOfMemoryError 확인



Transactions > 2017-12-11 08:54:22 ~ 2017-12-11 10:14:53 > 28810ms ~ 9999999ms

Export to Excel

tid :

Agent Type	Server IP	Client IP	Instance ID	URL	Status	Duration(ms)	SQL Time(ms)	Fetch Gab	Fetch Count	External Time	CPU Time(ms)	Start Time
WAS	5	1	0	/member/auth	500	178,684	93	178,543	92,982	0	3,203.13	2017-12-11 18:30:47.754
WAS	5	2		/member/auth	200	146,325	9,265	0	2	0	31.25	2017-12-11 18:31:19.925
WAS	5	2		/member/auth	200	143,590	0	0	2	0	31.25	2017-12-11 18:31:22.660
WAS	5	2		/log/tracking	200	134,481	0	0	0	0	15.63	2017-12-11 18:31:31.785
WAS	5	2	1	/log/tracking	200	129,779	0	0	0	0	46.88	2017-12-11 18:31:36.503
WAS	5	1	0	/member/auth	200	127,184	4,093	0	1	0	46.88	2017-12-11 18:31:39.066
WAS	5	2		/log/tracking	200	124,559	37,827	0	0	0	31.25	2017-12-11 18:31:41.691
WAS	5	2	3	/member/firstAct	200	119,107	0	0	1	0	78.13	2017-12-11 18:31:47.128

다수의 인스턴스에서 OutOfMemory 오류가 발생
사용자 인증시 데이터베이스 Fetch를 92,982건 호출함

Transaction Detail Trace StackTrace

Name	Value	Name	Value
Request URL	POST /member/auth View URL	Params	
Request Host	m.kr View Page	Status Code	500
Client IP	10 User Location	User Agent	Variables/2.0.7 (iPhone; iOS 10.3.2; Scale/3.00)
Start Time	2017-12-11 09:30:47.754	End Time	2017-12-11 09:30:47.754
Duration (ms)	178,684	CPU Time (ms)	3,203.13
JDBC Time (ms)	93	Latency (ms)	0
Thread Name	http-bio-80-exec-67	Thread ID	1819

OutOfMemory 오류가 발생함

Handler processing failed; nested exception is `java.lang.OutOfMemoryError: GC overhead limit exceeded`

Handler processing failed; nested exception is java.lang.OutOfMemoryError: GC overhead limit exceeded

Method Traces

```
[Num.][ Start Time | Elapsed | % | Excludi | A-Gab | CPUTime] Method Call
```

Application Performance Management

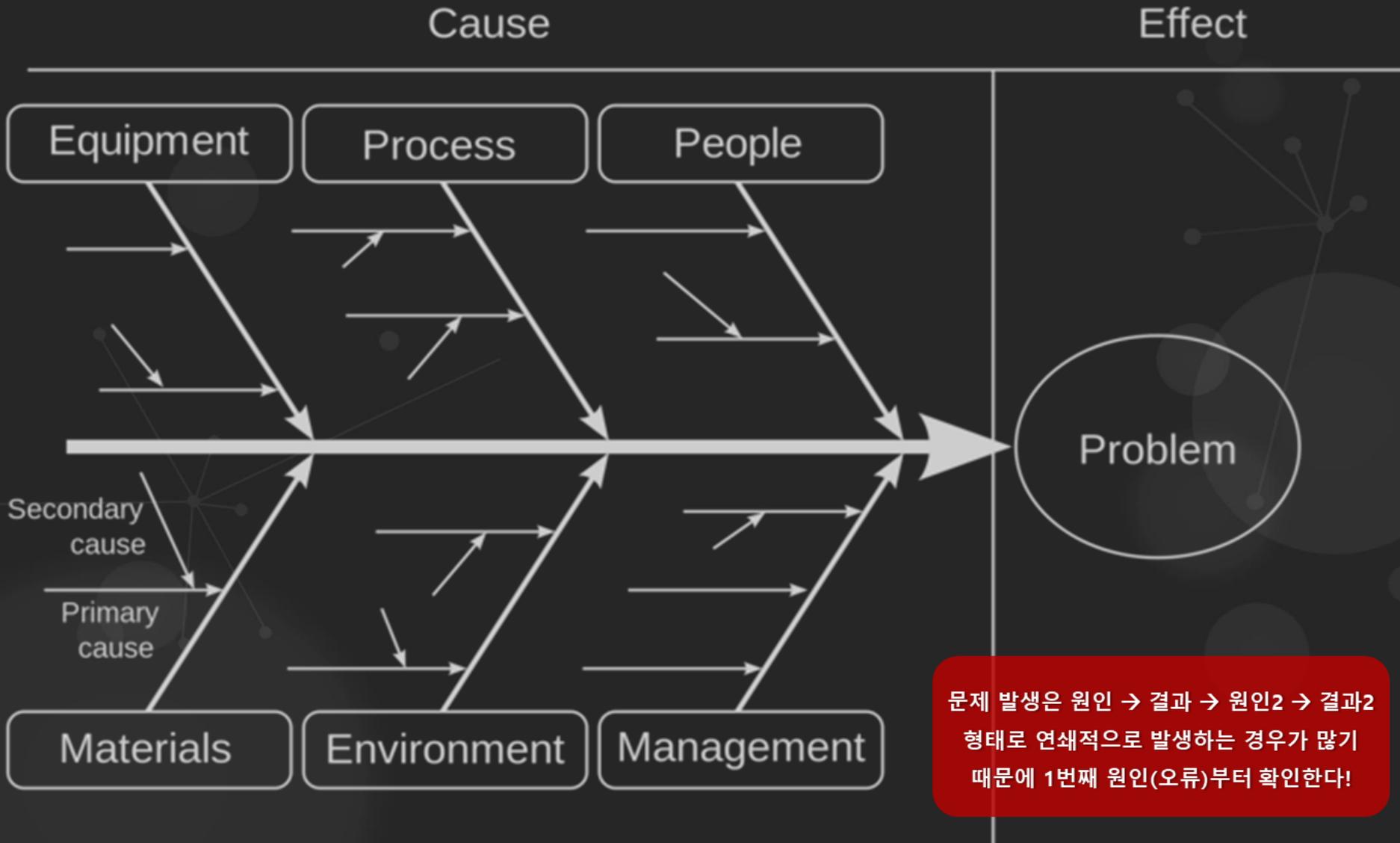
APM을 이용한 분석 방법



문제의 원인 결과 그래프 : Fish Bone



openmaru



문제 발생은 원인 → 결과 → 원인2 → 결과2 형태로 연쇄적으로 발생하는 경우가 많기 때문에 1번째 원인(오류)부터 확인한다!

대시보드에서 장애 상황이 확인되면 바로 확인



openmaru



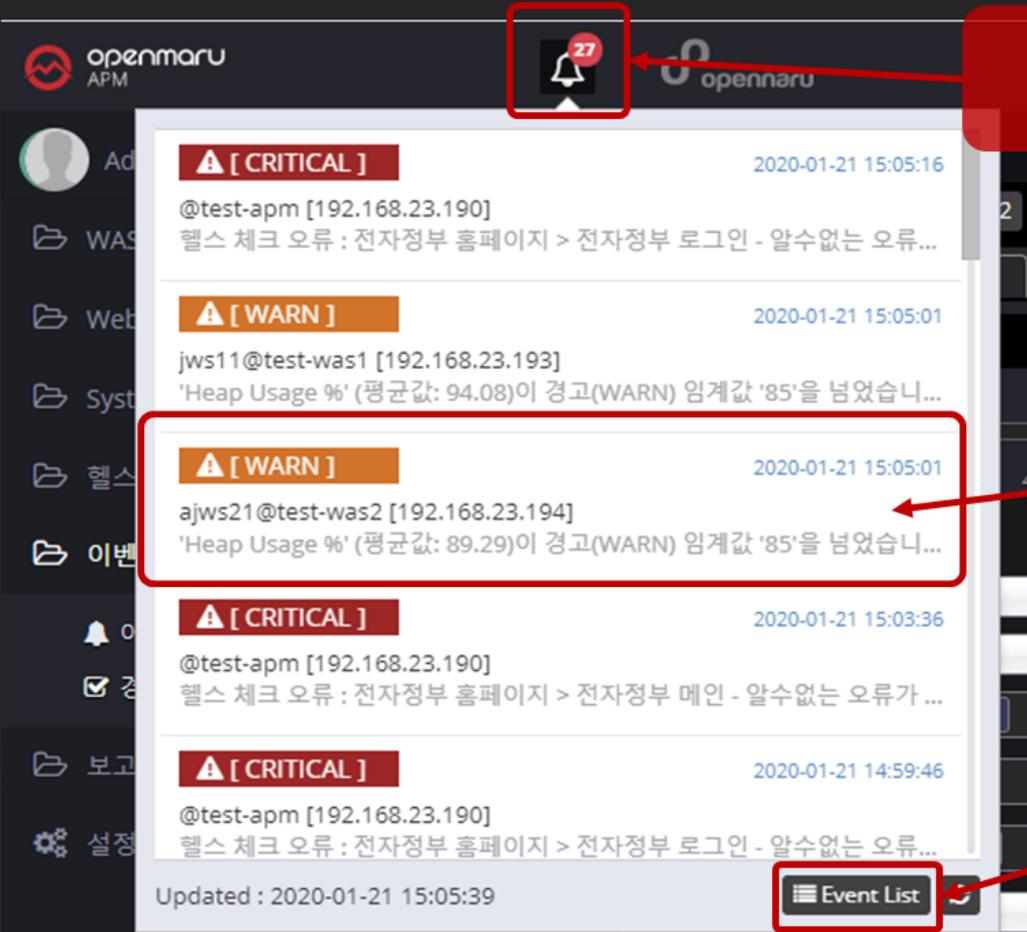
대시보드에서 장애 상황이 확인되면 바로 확인



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최근 이벤트 목록 확인



openmaru APM

27

[CRITICAL] 2020-01-21 15:05:16
@test-apm [192.168.23.190]
헬스 체크 오류 : 전자정부 홈페이지 > 전자정부 로그인 - 알수없는 오류...

[WARN] 2020-01-21 15:05:01
jws11@test-was1 [192.168.23.193]
'Heap Usage %' (평균값: 94.08)이 경고(WARN) 임계값 '85'을 넘었습니...

[WARN] 2020-01-21 15:05:01
ajws21@test-was2 [192.168.23.194]
'Heap Usage %' (평균값: 89.29)이 경고(WARN) 임계값 '85'을 넘었습니...

[CRITICAL] 2020-01-21 15:03:36
@test-apm [192.168.23.190]
헬스 체크 오류 : 전자정부 홈페이지 > 전자정부 메인 - 알수없는 오류가 ...

[CRITICAL] 2020-01-21 14:59:46
@test-apm [192.168.23.190]
헬스 체크 오류 : 전자정부 홈페이지 > 전자정부 로그인 - 알수없는 오류...

Updated : 2020-01-21 15:05:39

Event List

최근 10분간의 이벤트 건수를 표시

클릭하면 해당 차트로 이동

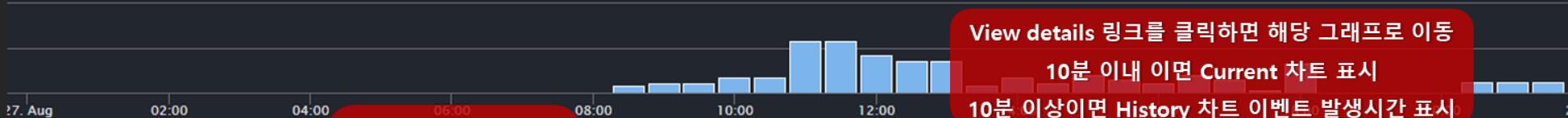
클릭하면 이벤트 목록 페이지로 이동

① 이벤트 확인 : 나중에 장애 원인 파악하는 경우

2019-08-27

lack Mail SMS

이벤트 발생건수 차트



View details 링크를 클릭하면 해당 그래프로 이동
10분 이내 이면 Current 차트 표시
10분 이상이면 History 차트 이벤트 발생시간 표시

이벤트 목록

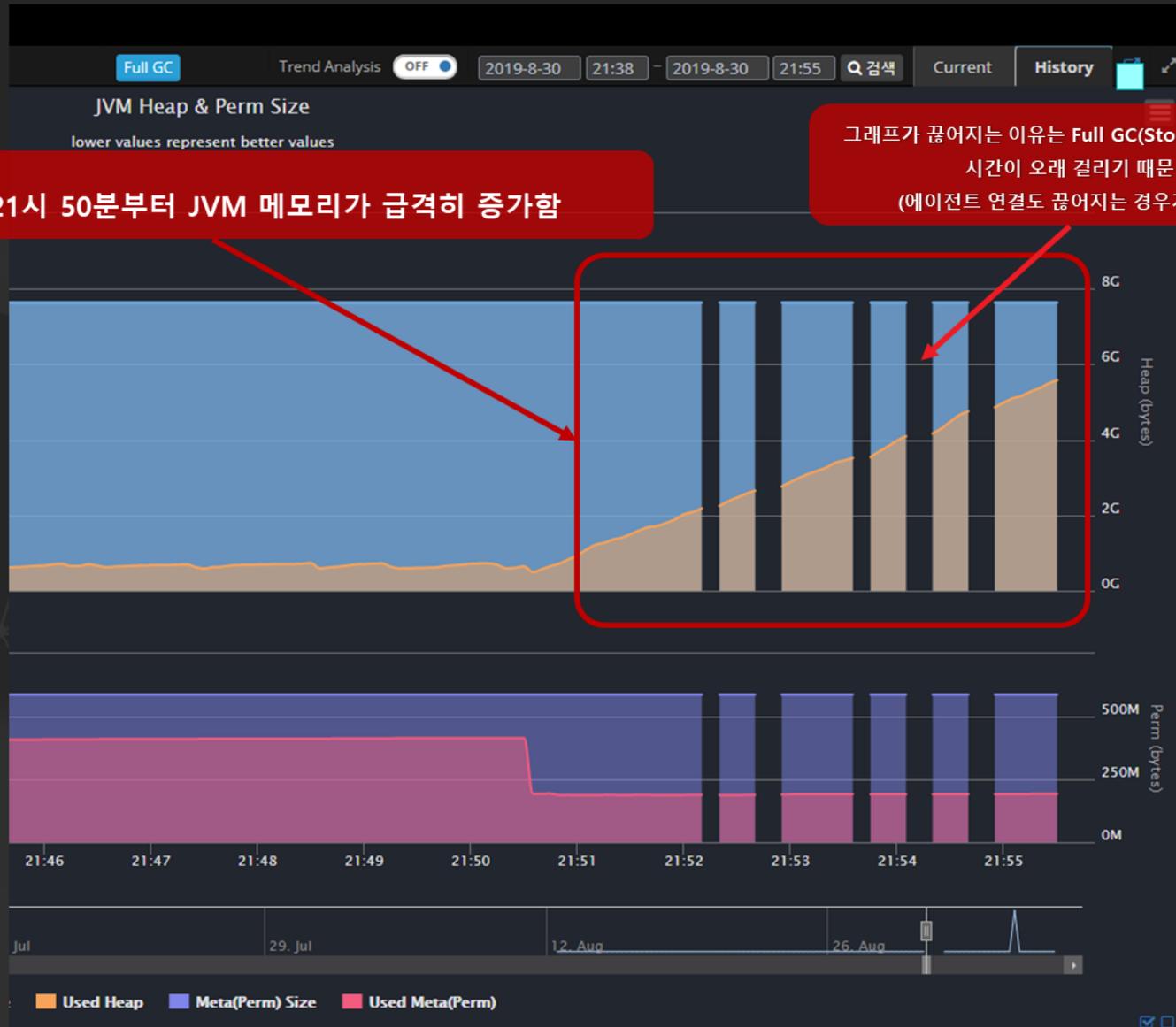
모든 필드 검색

GC 사용량%도 높아짐
서비스 오류율도 높아짐
CPU사용량도 높아짐

`/rest/bo/vw/.../select_vwtargetlist`에서 50만건이상의 데이터를 호출함(8월 27일 10:58)

#	Created	Level	Name	Type	Description	Link
1	2019-08-27 11:04:34	정보-INFO	EVENT_RES_SYSPROINFO	CPU	사용자가 요청한 '시스템 프로세스 정보'가 SYS@98.33.2.87에서 실행되었습니다.	View details.
2	2019-08-27 11:04:32	심각-CRIT...	EVENT_CRITICAL_THRESH...	CPU	'CPU' (평균값: 95.65)이 심각(CRITICAL) 임계값 '95'를 넘었습니다.	View details.
3	2019-08-27 11:04:23	경고-WARN	EVENT_WARN_OUTLIER	Error Rate %	'Error Rate %'의 현재값 '16.67'이 경고와는 다른 극단치에 해당하는 값입니다. (표준오차: 4.65)	View details.
4	2019-08-27 11:03:57	경고-WARN	EVENT_AGENT_DISCONNE...		WAS가 종료되어 에이전트와 연결이 끊어졌습니다.	View details.
5	2019-08-27 11:02:51	경고-WARN	ALERT_TOO_MANY_FETCH	DB ResultS...	너무 많은 데이터베이스 ResultSet fetch가 감지되었습니다. /rest/bo/vw/target/hshld/select_vwtargetlist에서 500000개	View details.
6	2019-08-27 11:02:28	경고-WARN	EVENT_WARN_THRESHOL...	GC Usage %	'GC Usage %' (평균값: 22.8)이 경고(WARN) 임계값 '20'를 넘었습니다.	View details.
7	2019-08-27 11:02:28	심각-CRIT...	EVENT_CRITICAL_THRESH...	GC Usage %	'GC Usage %' (평균값: 35.86)이 심각(CRITICAL) 임계값 '35'를 넘었습니다.	View details.
8	2019-08-27 11:01:45	경고-WARN	ALERT_TOO_MANY_FETCH	DB ResultS...	너무 많은 데이터베이스 ResultSet fetch가 감지되었습니다. /rest/bo/vw/target/hshld/select_vwtargetlist에서 400000개	View details.
9	2019-08-27 11:00:44	경고-WARN	ALERT_TOO_MANY_FETCH	DB ResultS...	너무 많은 데이터베이스 ResultSet fetch가 감지되었습니다. /rest/bo/vw/target/hshld/select_vwtargetlist에서 300000개	View details.
0	2019-08-27 11:00:27	경고-WARN	EVENT_WARN_OUTLIER	CPU	'CPU'의 현재값 '92.32'이 경고와는 다른 극단치에 해당하는 값입니다. (표준오차: 5.65)	View details.
1	2019-08-27 10:59:37	경고-WARN	EVENT_WARN_OUTLIER	Error Rate %	'Error Rate %'의 현재값 '14.29'이 경고와는 다른 극단치에 해당하는 값입니다. (표준오차: 8.68)	View details.
2	2019-08-27 10:59:33	경고-WARN	ALERT_TOO_MANY_FETCH	DB ResultS...	너무 많은 데이터베이스 ResultSet fetch가 감지되었습니다. /rest/bo/vw/target/hshld/select_vwtargetlist에서 200000개	View details.
3	2019-08-27 10:58:05	경고-WARN	ALERT_TOO_MANY_FETCH	DB ResultS...	너무 많은 데이터베이스 ResultSet fetch가 감지되었습니다. /rest/bo/vw/target/hshld/select_vwtargetlist에서 100000개	View details.
4	2019-08-27 10:45:23	경고-WARN	EVENT_WARN_OUTLIER	Error Rate %	'Error Rate %'의 현재값 '14.29'이 경고와는 다른 극단치에 해당하는 값입니다. (표준오차: 8.20)	View details.

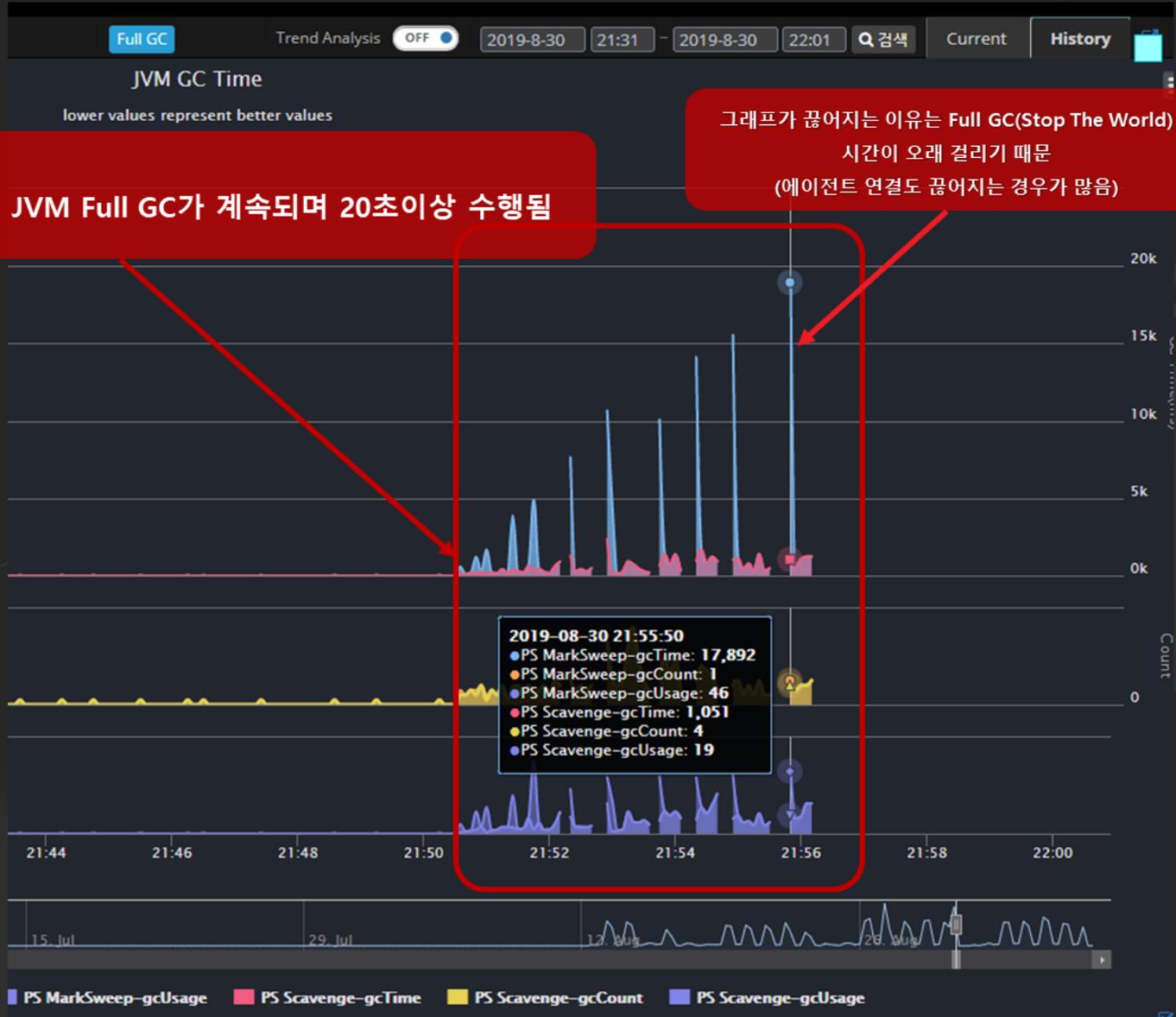
② 이벤트 목록 > View Details로 상세 원인 확인



② 이벤트 목록 > View Details로 상세 원인 확인



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② APM 에이전트 재 접속 - WAS가 재기동되었는지 확인

인스턴스 기동시 수집된 '서버 정보' 의
Diff 분석기능



[정보-INFO] WAS가 시작되어 에이전트가 연결되었습니다.
① 발생에이전트 : jws11C@test-was1[192.168.23.193]
클릭하여 상세한 정보를 확인하세요... 5s.

#	Started	UUID
1	2017-08-28 12:26:31	E1C7E966-1618-47...
2	2017-08-21 21:43:32	D666EC75-00C4-4E...
3	2017-08-21 20:51:51	FCE3CBE4-FAE8-4F...
4	2017-08-21 20:50:44	D9249D63-D84A-4C...
5	2017-08-21 20:27:01	6D91C02B-E620-4E...
6	2017-08-21 20:24:38	6AB159A4-ASD6-4E...
7	2017-08-21 20:18:02	63747A7B-937B-43...
8	2017-08-21 13:06:47	9CE65238-F369-43...
9	2017-08-21 10:46:16	8D8138B5-1373-4F...
10	2017-08-21 05:08:54	59C8370C-DFC7-46...
11	2017-08-21 02:25:30	33A38818-893C-4F...
12	2017-08-20 23:57:23	3B546292-62F5-49...
13	2017-08-20 01:40:44	BAA6618F-33F5-40...
14	2017-08-20 01:37:06	2750E92B-8AE3-4F...
15	2017-08-18 21:16:19	4C94110C-8D4A-4E...
16	2017-08-18 20:49:16	E226415B-EE87-4F...
17	2017-08-18 20:49:03	9DB04F23-E52D-43...
18	2017-08-18 20:49:00	11A79B64-B547-44...
19	2017-08-18 20:48:48	A0A53E60-4789-43...
20	2017-08-18 20:48:44	19209A1D-D988-4A...
21	2017-08-18 20:48:43	0BAF2C0D-9C4E-47...
22	2017-08-18 20:48:39	95A8DA55-B692-4A...
23	2017-08-18 20:48:37	17450178-E1CF-42...

```

Server Instance Info > 2017-08-28 12:26:31 (E1C7E966-1618-4761-955F-C
1- {
2-   "agentConfigInfo": {
3-     "sql_stacktrace_threshold": 30000,
4-     "sql_parameterize": false,
5-     "trace_enabled": true,
6-     "apdex_threshold": 1,
7-     "transaction_trace_threshold": 0,
8-     "last_modified": 1503314369000,
9-     "sql_capture_enabled": true,
10-    "transaction_trace_sampling_interval": 1,
11-    "userCharsetEncoding": "EUC-KR",
12-    "userInterceptorFile": "user-interceptor.conf",
13-    "userInterceptors": [
14-      "com.microsoft.sqlserver.*"
15-    ],
16-    "databaseFetchWarnings": [
17-      100000,
18-      200000,
19-      300000,
20-      400000,
21-      500000,
22-      600000,
23-      700000
24-    ],
25-    "databaseConnLeakWarning": false
26-  },
27-  "applicationInfo": {
28-    "port": 0,
29-    "agentVersion": "Version : 5.1.0, Build : 3333, Time : 28
30-    "agentType": "WAS",
31-    "hostName": "khan-dev01",
32-    "appType": "Unknown",
33-    "ipAddress": "192.168.23.11",
34-    "appName": "My Application",
35-    "instanceId": "server11",
36-    "compressType": 1
37-  },
38-  "jvmInfo": {
39-    "javaVersion": "1.7.0_79",
40-    "agentVersion": "5.1.0",
41-    "javaVendor": "Oracle Corporation",
42-    "agentType": "WAS",
43-    "javaPid": "9917",
44-    "javaRootClassPath": "/home/jjeon/jboss/eap/jboss-eap-6.3
45-    "javaClassPath": "/home/jjeon/jboss/eap/jboss-eap-6.3/jbc
  
```

```

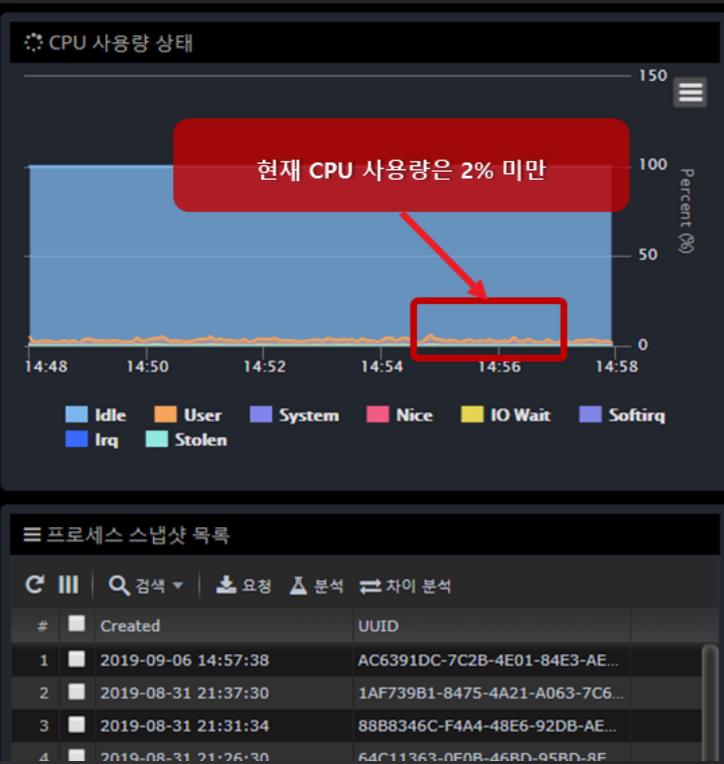
2-   "agentConfigInfo": {
3-     "sql_stacktrace_threshold": 30000,
4-     "sql_parameterize": false,
5-     "trace_enabled": true,
6-     "apdex_threshold": 1,
7-     "transaction_trace_threshold": 0,
8-     "last_modified": 1503314369000,
9-     "sql_capture_enabled": true,
10-    "transaction_trace_sampling_interval": 1,
11-    "userCharsetEncoding": "EUC-KR",
12-    "userInterceptorFile": "user-interceptor.conf",
13-    "userInterceptors": [
14-      "com.microsoft.sqlserver.*"
15-    ],
16-    "databaseFetchWarnings": [
17-      100000,
18-      200000,
19-      300000,
20-      400000,
21-      500000,
22-      600000,
23-      700000
24-    ],
25-    "databaseConnLeakWarning": false
26-  },
27-  "applicationInfo": {
28-    "port": 0,
29-    "agentVersion": "Version : 5.1.0, Build : 3333, Time : 28
30-    "agentType": "WAS",
31-    "hostName": "khan-dev01",
32-    "appType": "jboss7",
33-    "ipAddress": "192.168.23.11",
34-    "appName": "My Application",
35-    "instanceId": "server11",
36-    "compressType": 1
37-  },
38-  "jvmInfo": {
39-    "javaVersion": "1.7.0_79",
40-    "agentVersion": "5.1.0",
41-    "javaVendor": "Oracle Corporation",
42-    "agentType": "WAS",
43-    "javaPid": "27833",
44-    "javaRootClassPath": "/home/jjeon/jboss/eap/jboss-eap-6.3
45-    "javaClassPath": "/home/jjeon/jboss/eap/jboss-eap-6.3/jbc
  
```

에이전트 접속 반복

WAS 시작시 변경된 환경 변수, Java Option, PID등을 Diff로 파악할 수 있음

javaPid 값이 변경되었으면
WAS가 재기동된 것임

② 이벤트 목록 > View Details로 상세 원인 확인



CPU를 100% 모두 사용하는 상황

Load Average도 최근 값이 5.7로 높아지는 추세에 있음

분석 > 2019-08-26 17:11:30

Uptime: 51 days 20:11:47

Load Avg: 5.7, 3, 1.7 (1m, 5m, 15m)

286 Total / 285 Sleeping, 0 Running, 1 Zombie, 0 Stopped

User: 100.0% System: 0.0% Nice: 0.0% Wait: 0.0% Idle: 0.0%

5 GB, Used: 67.0 GB, Free: Swap Total: 8.4 GB, Used: 190.8 MB, Free: 8.2 GB

Start Time	Mem	RSS Mem	Shared ...	State	CPU Time	CPU(%)	MEM...	Command
2019-08-23 18:10...	15.1 GB	10.1 GB	32.6 MB	Sleeping	01:41:37.2	753.7%	15.0%	java:jeus.server.ServerBootstrapper
2019-08-12 18:11...	2.3 GB	127.3 MB	11.7 MB	Sleeping	08:10:35.4	3.7%	3.2%	java:com.openmaru.khan.agent.sys.La
2019-08-23 18:11...	15.1 GB	2.3 GB	32.7 MB	Sleeping	01:31:34.5	3.7%	3.5%	java:jeus.server.ServerBootstrapper
2019-07-18 15:05...	2.2 GB	51.8 MB	1.7 MB	Sleeping	04:58:29.3	2.8%	0.1%	/home/onm/NGFAgent/bin/NGFAgent.
2019-08-13 20:16...	7.6 GB	1.6 GB	24.6 MB	Sleeping	02:06:55.8	0.9%	2.3%	java:jeus.server.ServerBootstrapper
2019-08-22 17:41...	8.0 GB	1.1 GB	26.5 MB	Sleeping	01:39:29.1	0.9%	1.6%	java:jeus.server.ServerBootstrapper
2019-07-05 21:00...	19.8 MB	1.4 MB	1.2 MB	Sleeping	00:00:01.1	0.0%	0.0%	/sbin/init
2019-07-05 21:00...	0 Byte	0 Byte	0 Byte	Sleeping	00:01:22.7	0.0%	0.0%	ksobrqd/0
2019-07-05 21:00...	0 Byte	0 Byte	0 Byte	Sleeping	00:00:00.0	0.0%	0.0%	stopper/0
2019-07-05 21:00...	0 Byte	0 Byte	0 Byte	Sleeping	00:00:04.0	0.0%	0.0%	watchdog/0
2019-07-05 21:00...	0 Byte	0 Byte	0 Byte	Sleeping	00:00:12.8	0.0%	0.0%	migration/1

장애 시 자동 생성된 프로세스 상태 분석 스냅샷 분석

→ Full GC가 계속되어 WAS 인스턴스가 CPU를 753% 사용 중

• 대시보드가 빨간색인 경우

- 대시보드에서 빨간색으로 지연이 발생하면
- 스레드 덤프 생성
- 스레드 덤프가 생성되면 바로 분석 → 분석이 어려우면 Quick Service 요청
- 최근 이벤트 목록 확인

• 과거 장애현상 분석

- 과거 장애를 분석하려면 이벤트 → 이벤트 목록 확인
- 장애 상황 / 시간 파악
- 원인 → 결과 & 원인2 → 결과2
- 첫번째 근본 원인부터 찾아야 함
- 스레드 덤프 생성 이벤트가 있으면 이동하여 분석
- 이벤트 View Details 링크로 그래프 이동하여 원인 분석

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Application Performance Management

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제품이나 서비스에 관한 문의

콜 센터 : 02-469-5426 (휴대폰 : 010-2243-3394)

전자메일 : sales@openmaru.com

2019년도 신입 · 경력 채용 공고

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- 채용문의 02-469-5426

